https://ca1lib.org/book/2532932/c89d48

EDITED BY
TAKESHI INOMATA
AND DANIELA TRIADAN

LIFE AND POLITICS AT THE ROYAL COURT OF
AGUATECA: Artifacts, Analytical Data, and Synthesis

volume 3

Monographs of the Aguateca Archaeological Project First Phase
Takeshi Inomata and Daniela Triadan, *General Editors*

Life and Politics at the Royal Court of Aguateca:

Artifacts, Analytical Data, and Synthesis

Life and Politics at the Royal Court of Aguateca:
Artifacts, Analytical Data, and Synthesis

Edited by

TAKESHI INOMATA AND DANIELA TRIADAN

Monographs of the Aguateca Archaeological Project First Phase
Takeshi Inomata and Daniela Triadan, General Editors
Volume 3

The University of Utah Press
Salt Lake City

Copyright © 2014 by The University of Utah Press. All rights reserved.

The Defiance House Man colophon is a registered trademark of the
University of Utah Press. It is based on a four-foot-tall Ancient Puebloan
pictograph (late PIII) near Glen Canyon, Utah.

18 17 16 15 14 1 2 3 4 5

Library of Congress Cataloging-in-Publication Data

Life and politics at the royal court of Aguateca : artifacts, analytical data, and synthesis /
edited by Takeshi Inomata and Daniela Triadan.
pages cm. — (Monographs of the Aguateca Archaeological Project first phase ; v. 3)
Includes bibliographical references and index.
ISBN 978-1-60781-318-7 (cloth : alk. paper) — ISBN 978-1-60781-319-4 (ebook)
1. Aguateca Site (Guatemala) 2. Mayas—Guatemala—Antiquities. 3. Excavations
(Archaeology)—Guatemala—Aguateca Site. I. Inomata, Takeshi, 1961– editor of
compilation, author. II. Triadan, Daniela, 1964– editor of compilation, author.
F1435.1.A37L54 2014
972.81'2—dc23
2013042715

Printed and bound by Sheridan Books, Inc., Ann Arbor, Michigan.

Contents

List of Figures vii

List of Tables xi

Acknowledgments xiii

1. Introduction 1
   TAKESHI INOMATA

PART A: ARTIFACTS, ECOLOGICAL STUDIES, AND CONSERVATION

2. Figurines 9
   DANIELA TRIADAN

3. Worked Sherds and Other Ceramic Artifacts 39
   TAKESHI INOMATA

4. Spindle Whorls 49
   TAKESHI INOMATA

5. Grinding Stones and Related Artifacts 54
   TAKESHI INOMATA

6. Stone Ornaments and Other Stone Artifacts 84
   TAKESHI INOMATA AND MARKUS EBERL

7. Ceramic Laminates 118
   HARRIET F. BEAUBIEN

8. Bone and Shell Artifacts 127
   TAKESHI INOMATA AND KITTY EMERY

9. Aguateca Animal Remains 158
   KITTY EMERY

10. Food, Farming, and Forest Management at Aguateca 201
DAVID L. LENTZ, BRIAN LANE, AND KIM THOMPSON

11. Artifact Conservation 216
HARRIET F. BEAUBIEN

PART B: MONUMENTS AND HIEROGLYPHIC TEXTS

12. Monuments 233
STEPHEN D. HOUSTON

13. Miscellaneous Texts 256
STEPHEN D. HOUSTON

PART C: SYNTHESIS AND CONCLUSIONS

14. Synthesis of Data from the Rapidly Abandoned Buildings. 271
TAKESHI INOMATA

15. Conclusions 320
TAKESHI INOMATA

Appendix: Radiocarbon Dates from Aguateca 331
TAKESHI INOMATA

References 333
Index 351

Figures

1.1. Map of Aguateca 2
1.2. Map of the Palace Group and the Causeway . 3
1.3. Map of the Main Plaza 4
1.4. Map of the Barranca Escondida 5
2.1. Figurine molds 16
2.2. Solid figurines 17
2.3. Whistles, warriors 18
2.4. Whistles, warriors 19
2.5. Whistles, warriors 20
2.6. Whistle, noble with feathered headdress . . . 21
2.7. Whistles, males with elaborate attire 23
2.8. Whistles, males with simple attire 24
2.9. Whistles, ball players 25
2.10. Whistles, females with elaborate attire 26
2.11. Whistles, females with simple attire 27
2.12. Whistles, animals 28
2.13. Whistles, animals 29
2.14. Whistles, supernaturals and grotesques 29
2.15. Whistles with multiple resonators 30
2.16. Whistles with multiple resonators 31
2.17. Flute with pizote appliqué 32
2.18. Flutes 33
2.19. Ceramic bells, felines 34
2.20. Ceramic bells, unidentified zoomorphic . . . 35
2.21. Hollow-heads 36
2.22. Vessel-shaped figurine, a pendant, and a zoomorphic figurine 37
2.23. Figurine assemblages found in situ 38
2.24. Part of the figurine assemblage from Structure M8-8 38
3.1. Medium-sized round worked ceramic disks . 40
3.2. Medium-sized round worked ceramic disks . 41
3.3. Notched ceramic sherds 41
3.4. Worked ceramic sherds 42
3.5. Worked ceramic sherds from Structures M8-13 and M7-34 44
3.6. Worked ceramic sherds from the northern part of Structure M8-4 44
3.7. Worked ceramic sherds from the southern part of Structure M8-4 45
3.8. Clay caked on worked sherds 45
3.9. Ceramic beads and rings 46
3.10. Other ceramic artifacts 48
3.11. Unfired clay from Structure M8-4 48
4.1. Spindle whorls from Structures M7-22 and M7-32 51
4.2. Spindle whorls from Structure M8-4 51
4.3. Spindle whorls from Structure M8-8 52
4.4. Spindle whorls from Structure M8-13 52
4.5. Spindle whorls from Structures M8-2 and M8-3 53
4.6. Spindle whorls from Structure M7-21 53
4.7. Spindle whorls from Structure M7-21 53
4.8. Doughnut-shaped spindle whorls from Structures M8-2 and M8-3 53
5.1. Flat igneous rock metate from Structure M7-22 55
5.2. Shallow basin limestone metate from Structure M7-32 56
5.3. Limestone metates from Structures M7-22 and M7-32 56
5.4. Shallow basin limestone metate from Structure M8-4 56
5.5. Flat igneous rock metate from Structure M8-4 57
5.6. Metates from Structure M8-4 57
5.7. Shallow basin limestone metate from Structure M8-8 57
5.8. Shallow basin limestone metate from Structure M8-8 58
5.9. Deep basin limestone metate from Structure M8-8 58

5.10. Deep basin limestone metate from Structure M8-8 . . . 58
5.11. Deep basin limestone metate from Structure M8-8 . . . 58
5.12. Deep basin limestone metate from Structure M8-8 . . . 59
5.13. Deep basin quartzite metate from Structure M8-8 . . . 59
5.14. Metates from Structure M8-8 . . . 59
5.15. Metates and matching manos from Structure M8-8 . . . 60
5.16. Flat sandstone metate and matching mano from Structure M8-8 . . . 60
5.17. Shallow basin limestone metate from Structure M8-13 . . . 60
5.18. Deep basin limestone metate from Structure M8-13 . . . 61
5.19. Limestone metates with matching manos from Structure M8-13 . . . 61
5.20. Shallow basin limestone metate from Structure M8-2 . . . 61
5.21. Limestone metate from Structure M8-2 and matching manos from Structure M8-4 . . . 64
5.22. Flat limestone metate from Structure M7-34 . . . 64
5.23. Shallow basin limestone metate from Structure M7-34 . . . 64
5.24. Deep basin limestone metate from Structure M7-34 . . . 64
5.25. Deep basin limestone metate from Structure M7-34 . . . 65
5.26. Metates and matching manos from Structure M7-34 . . . 65
5.27. Quartzite metate from Structure M7-91 and matching mano from Structure M8-4 . . . 65
5.28. Limestone manos from Structure M8-4 . . . 66
5.29. Limestone manos . . . 66
5.30. Limestone manos . . . 67
5.31. Manos from Structure M8-4 . . . 67
5.32. Manos from Structure M8-8 . . . 68
5.33. Manos from Structure M8-8 . . . 68
5.34. Limestone manos from Structure M8-13 . . . 68
5.35. Manos from Structures M8-2 and M8-3 . . . 69
5.36. Manos from Structure M7-34 . . . 69
5.37. Approximate locations of matching metates and manos . . . 71
5.38. Limestone doughnut stones from Structures M8-4 and M8-8 . . . 77
5.39. Limestone doughnut stones . . . 78
5.40. Limestone flat stone with fine incisions . . . 79
5.41. Limestone flat stone with fine incisions . . . 80
5.42. Limestone flat stones . . . 81
5.43. Limestone flat stones . . . 82
5.44. Limestone artifacts of unknown function . . . 83
6.1. Stone beads . . . 86
6.2. Greenstone ornaments from Structure M8-8 86
6.3. Tubular greenstone beads . . . 86
6.4. Button-shaped greenstone ornaments . . . 86
6.5. Stone ornaments . . . 87
6.6. Greenstone ornaments . . . 87
6.7. Stone ornaments from termination ritual deposits of Structures M7-22 and M7-32 . . . 88
6.8. Greenstone ornaments associated with easternmost room of Structure M7-22 . . . 89
6.9. Stone ornaments found in and around Structure M8-4 . . . 89
6.10. Stone ornaments . . . 90
6.11. Stone ornaments found in the Barranca Escondida . . . 90
6.12. Jester God diadem made of alabaster . . . 92
6.13. Jester God diadem made of alabaster . . . 93
6.14. Rectangular plaques . . . 94
6.15. Distribution of fragments of a jade pendant . 95
6.16. Pyrite ornaments . . . 97
6.17. Pyrite ornaments and nodules . . . 98
6.18. Pyrite mosaic mirror pieces and recycled artifacts . . . 99
6.19. Pyrite mirror pieces . . . 100
6.20. Reworking process of mosaic mirror pieces . 101
6.21. Mirror backs from Structure M7-22 . . . 102
6.22. Mirror backs from Structure M7-22 . . . 102
6.23. Mirror backs from Structure M7-22 . . . 103
6.24. Mirror backs from Structures M7-22 and M7-32 . . . 105
6.25. Sandstone mirror back from Structure M8-4 106
6.26. Sandstone mirror back from Structure M8-4 107
6.27. Mirror backs from Structures M8-4 and M8-8 . . . 108
6.28. Mirror backs from Structure M8-4 . . . 109
6.29. Alabaster vessel fragments from Structures M7-22 and M7-32 . . . 111
6.30. Alabaster vessel fragments from Structures M8-4 and M8-13 . . . 111
6.31. Alabaster vessel fragments from Structures M7-22 and M7-32 . . . 112

6.32. Alabaster vessel fragments from Structures M8-4 and M8-3 112
6.33. Pumice stones 114
6.34. Possible pigments. 115
6.35. Phallic object from Structure M8-8 116
6.36. Petrified wood from the Barranca Escondida 116
6.37. Other stone artifacts 116
7.1. Ceramic laminate deposits from Structure M7-22 119
7.2a. Drawings of reconstructed ceramic laminate mask. 120
7.2b. Photographs of reconstructed ceramic laminate mask. 121
7.3. Ceramic laminate headdress 122
7.4. Selected fragments of the headdress 122
7.5. Microscopic views of mask fragments. 123
7.6. Ceramic laminate fabrication process. 124
8.1. Elongated, pointed bone artifacts 129
8.2. Probable bone awls. 130
8.3. Bone spatulas and other objects 131
8.4. Tubular bone objects, small ornaments, and disk 133
8.5. Elaborately carved bone objects 134
8.6. Bone debitage and preforms 135
8.7. Bone artifacts from Structures M7-22 and M7-32 136
8.8. Bone artifacts from Structure M8-4. 137
8.9. Bone artifacts from Structures M8-4 and M8-8. 138
8.10. Bone artifacts from Structure M8-8 139
8.11. Bone artifacts from Structures M8-13, M8-2, M8-3, and M7-34. 140
8.12. Shell tinklers, beads, rings, and ornaments . . 143
8.13. Shell artifacts and ear ornaments. 144
8.14. Possible spearthrower finger-loops and ornaments with unknown use 145
8.15. Shell artifacts from Structure M7-22 146
8.16. Shell tinklers, beads, and rings 147
8.17. Shell artifacts from Structures M7-32 and M8-4 148
8.18. Shell artifacts from Structure M8-4 150
8.19. Shell artifacts from Structure M8-4 151
8.20. Shell artifacts from Structure M8-8 152
8.21. Shell artifacts from Structures M8-13, M8-2, and M8-3. 153
8.22. Shell artifacts from Structure M7-34 154
10.1. Electron micrographs of charcoal 207
10.2. Paleobotanical remains 210
11.1. Storage supports and containers fabricated for artifacts 219
11.2. Conservation of a ceramic vessel. 222
11.3. Conservation of a ceramic vessel. 223
11.4. Conservation of a ceramic vessel. 224
11.5. Conservation of a ceramic laminate artifact . 225
11.6. Conservation of a stone dish 226
11.7. Conservation of a pyrite mirror 227
11.8. Conservation of a bone artifact 228
11.9. Conservation of a carved shell 228
12.1. Closeup photograph of Stela 6 235
12.2. Name glyph of Tahn Te' K'inich 235
12.3. Glyphs of "GI" K'awiil. 236
12.4. Stela 6 239
12.5. Stela 13 240
12.6. Stela 14 242
12.7. Stela 14 243
12.8. Stela 19 245
12.9. Glyph blocks of Stela 19 246
12.10. Stela 15 249
12.11. Stela 16 251
12.12. Monuments similar to Stela 16 252
12.13. Stela 17 253
12.14. Stela 18 254
13.1. Polychrome ceramic vase painted with glyphic texts 257
13.2. Glyphic texts carved on alabaster vessels . . . 260
13.3. Glyphs on polished stone fragments 261
13.4. Carved bone. 263
13.5. Carved bone. 265
13.6. Carved bone fragments 266
13.7. Carved helmet shell 267
13.8. Carved shell. 266
14.1. Distribution of ceramic vessels in Structure M8-4 276
14.2. Distribution of grinding stone artifacts in Structure M8-4 277
14.3. Distribution of obsidian artifacts in Structure M8-4 278
14.4. Distribution of chipped stone tools in Structure M8-4 279
14.5. Distribution of polished axes, polishing stones, pigments, unfired clay, and reworked sherds in Structure M8-4 280
14.6. Distribution of pyrite artifacts in Structure M8-4 281

14.7. Distribution of pyrite artifacts in the south room of Structure M8-4 282
14.8. Distribution of bone artifacts, spindle whorls, figurines, and ceramic drums in Structure M8-4 283
14.9. Distribution of shell artifacts and stone ornaments in Structure M8-4 284
14.10. Chert stone pestles and palettes found in Structure M8-4 286
14.11. Sandstone mortar found in the center room of Structure M8-4 286
14.12. Chert faceted smoother found in the north room of Structure M8-4. 287
14.13. Distribution of ceramic vessels in Structure M8-8 288
14.14. Distribution of grinding stone artifacts, mortars, and bark beaters in Structure M8-8 . 289
14.15. Distribution of obsidian artifacts in Structure M8-8 290
14.16. Distribution of chipped stone tools in Structure M8-8 291
14.17. Distribution of polished axes, polishing stones, pigments, and unfired clay in Structure M8-8 292
14.18. Distribution of bone artifacts, spindle whorls, figurines, and ceramic drums in Structure M8-8 293
14.19. Distribution of shell artifacts and stone ornaments in Structure M8-8 294
14.20. Distribution of ceramic vessels in Structure M8-13. 297
14.21. Distribution of grinding stone artifacts, spindle whorls, bone artifacts, and figurines in Structure M8-13 298
14.22. Distribution of obsidian artifacts in Structure M8-13. 299
14.23. Distribution of chipped stone tools in Structure M8-13. 300
14.24. Distribution of polished axes, polishing stones, pigments, shell artifacts, stone ornaments, and worked sherds in Structure M8-13. 301
14.25. Distribution of ceramic vessels in Structures M8-2 and M8-3 302
14.26. Distribution of grinding stone artifacts, limestone blocks, spindle whorls, bone artifacts, and figurines in Structures M8-2 and M8-3. 303
14.27. Distribution of obsidian artifacts in Structures M8-2 and M8-3 304
14.28. Distribution of chipped stone tools in Structures M8-2 and M8-3 305
14.29. Distribution of polishing stones, pigments, shell artifacts, and stone ornaments in Structures M8-2 and M8-3 306
14.30. Distribution of ceramic vessels in Structure M7-34 and surrounding areas 307
14.31. Distribution of grinding stone artifacts, spindle whorls, bone artifacts, and figurines in Structure M7-34 and surrounding areas . . . 308
14.32. Distribution of obsidian artifacts in Structure M7-34 and surrounding areas . . . 309
14.33. Distribution of chipped stone tools in Structure M7-34 and surrounding areas . . . 310
14.34. Distribution of polished axes, polishing stones, pigments, shell artifacts, stone ornaments, and worked sherds in Structure M7-34 and surrounding areas 311
15.1. Map of the area around Aguateca 321
A1. Probability distributions of calibrated radiocarbon dates. 331

Tables

2.1. In situ and discarded figurines per operation 10
2.2. Frequencies of figurine functions 11
2.3. Figurine motifs 13
2.4. Frequencies of figurine motifs 13
2.5. Animal representations 13
3.1. Medium-sized round worked sherds 40
3.2. Worked sherds with notched ends 41
3.3. Other worked sherds with smoothed edges 42
3.4. Worked sherds with rough edges 43
3.5. Ceramic beads 46
3.6. Other ceramic artifacts 47
4.1. Types and materials of spindle whorls 50
4.2. Distribution of spindle whorls 50
5.1. Types and materials of metates 55
5.2. Types and materials of manos 62
5.3. End use of manos 67
5.4. Distribution of metates and manos 70
5.5. Complete or reconstructible metates and their matching manos 72
5.6. Complete or reused manos with their matching metates 73
5.7. Doughnut stones 76
5.8. Miscellaneous ground stones 79
6.1. Types of stone ornaments 85
6.2. Condition of stone ornaments 95
6.3. Types of pyrite artifacts 96
6.4. Mirror backs 104
6.5. Alabaster vessels 110
6.6. Pumice stones 113
6.7. Types of pigments 114
8.1. Distribution of bone artifacts 128
8.2. Distribution of shell artifact types by operation 142
8.3. Condition of bone artifacts 156
9.1. Taxonomic list of animals from the Aguateca faunal assemblages 160
9.2. Animal remain counts and percentages 163
9.3. Comparisons by structure of animal remains 165
9.4. Number of invertebrate specimens and individuals in the structure assemblages 168
9.5. Number of vertebrate specimens and individuals in the structure assemblages 170
9.6. Percentage of elements and body portions found for select taxon in the structure assemblages 188
9.7. Percentage of juvenile and left elements in the structure assemblages 192
10.1. Plant remains by provenience 202
10.2. Plant remains by taxon 204
12.1. Hieroglyphic dates at Aguateca 234
14.1. Distribution of ceramic vessels by rooms and areas 272
14.2. Distribution of artifacts by rooms and areas 273
14.3. Total weight of ceramics by structure 316
14.4. Sums of ceramic vessel volumes 317
A1. Radiocarbon dates from Aguateca 332

Acknowledgments

We thank the Instituto de Antropología e Historia de Guatemala for the permit granted for our field and lab work. Financial support for the project was provided by the National Science Foundation (BCS-9707950, BCS-9974302, and BCS-9910594), Mitsubishi Foundation, National Geographic Society, Sumitomo Foundation, Foundation for the Advancement of Mesoamerican Studies, and H. John Heinz III Charitable Trust. In addition, the National Science Foundation made this publication possible through a subvention (BCS-0836904). David Freidel and Payson Sheets read a draft of this book and offered thoughtful comments. Kazuo Aoyama commented on Chapter 14. Jessica Munson and Victor Castillo assisted Inomata in the preparation of figures, and Melissa Burham organized the bibliography. More complete acknowledgments and descriptions of project participants are presented in Volume 1.

chapter

1

Introduction

Takeshi Inomata

This book is the third and final volume of the Monographs of the Aguateca Archaeological Project First Phase, which present the results of archaeological investigations conducted at the Maya center of Aguateca, Guatemala, from 1996 through 1999, as well as the results of lab analyses carried out through 2003. The primary goal of the project was to examine the negotiation of social relations in Classic Maya society, particularly among its elite members. Important issues included the construction of power and authority of the elite, the organization of the royal court, negotiations among the courtiers, relations between different genders and age groups, patterns of activities in the residences, the articulation of domestic activities with courtly affairs, and craft production by the elite. We addressed these questions primarily through the extensive excavations of elite residences and associated structures that were burned and abandoned around AD 810 because of a military attack. Numerous complete and reconstructible artifacts left in their location of use or storage provided us with a unique opportunity to examine the life of the Classic Maya in unprecedented resolution. Volume 1 of the monograph series, by Takeshi Inomata and Daniela Triadan (2010), discusses the results of excavations and ceramic vessels, and Volume 2, by Kazuo Aoyama (2009), examines various kinds of stone artifacts. The present volume covers the analysis of other artifact types, including figurines, worked sherds and other ceramic artifacts, spindle whorls, grinding stones, stone ornaments and other stone artifacts, ceramic laminates and masks, and bone and shell artifacts. In addition, the authors discuss stone monuments and other hieroglyphic texts, the analysis of botanical and faunal remains, and conservation work, and present a synthesis and a conclusion.

OBJECTIVES, METHODS, AND STRATEGIES

Readers can refer to Volume 1 for a comprehensive discussion of the research design, objectives, and methodology of the project, but it is useful to recapitulate some important points here. Extensively excavated buildings include Structures M7-22 (House of Masks) and M7-32 (House of Bones) of the Palace Group, which most likely served as a royal residential complex, and Structures M7-34 (House of Metates), M8-2, M8-3, M8-4 (House of Mirrors), M8-8 (House of Axes), and M8-13 in the elite residential area south of the Palace Group (Figures 1.1, 1.2). Structures M8-4 and M8-8 were probably elite residences whereas Structure M8-13 may have been a residence of a somewhat lower-status group. Structures M8-2 and M8-3 appear to have been workshops or residences of servants, and Structure M8-34 may have been a communal house where various elite individuals gathered for feastings and other meetings. Structures M7-22 and M7-32 of the Palace Group appear to have been abandoned before the final attack. The buildings were ritually destroyed, and dense ritual deposits were placed in and around these buildings. Only the easternmost room of Structure M7-22 seems to have served as a royal storage room, and it contained numerous complete and reconstructible objects. Structures M7-34, M8-2, M8-3, M8-4, M8-8, and M8-13 were burned, probably during the attack, and numerous objects were left behind in their locations of use or storage. In addition, we excavated Structures L8-5 and L8-6, temples in the Main Plaza; an area called the Barranca Escondida in the escarpment south of the Main Plaza, where we documented multiple stone monuments; and small test pits in an elite residential area west of the Main Plaza, called the Granada Group (Figures 1.3, 1.4).

Excavations followed 2-×-2-m grid systems, and we used a hierarchical lot system for provenience control, consisting of operation-suboperation-unit-level-lot. For example, 23A3-3-1 means Operation 23, Suboperation A, Unit 3, Level 3, Lot 1. Operations generally refer to excavations in a group of mounds, suboperations to those of individual mounds, and units to horizontal divisions usually

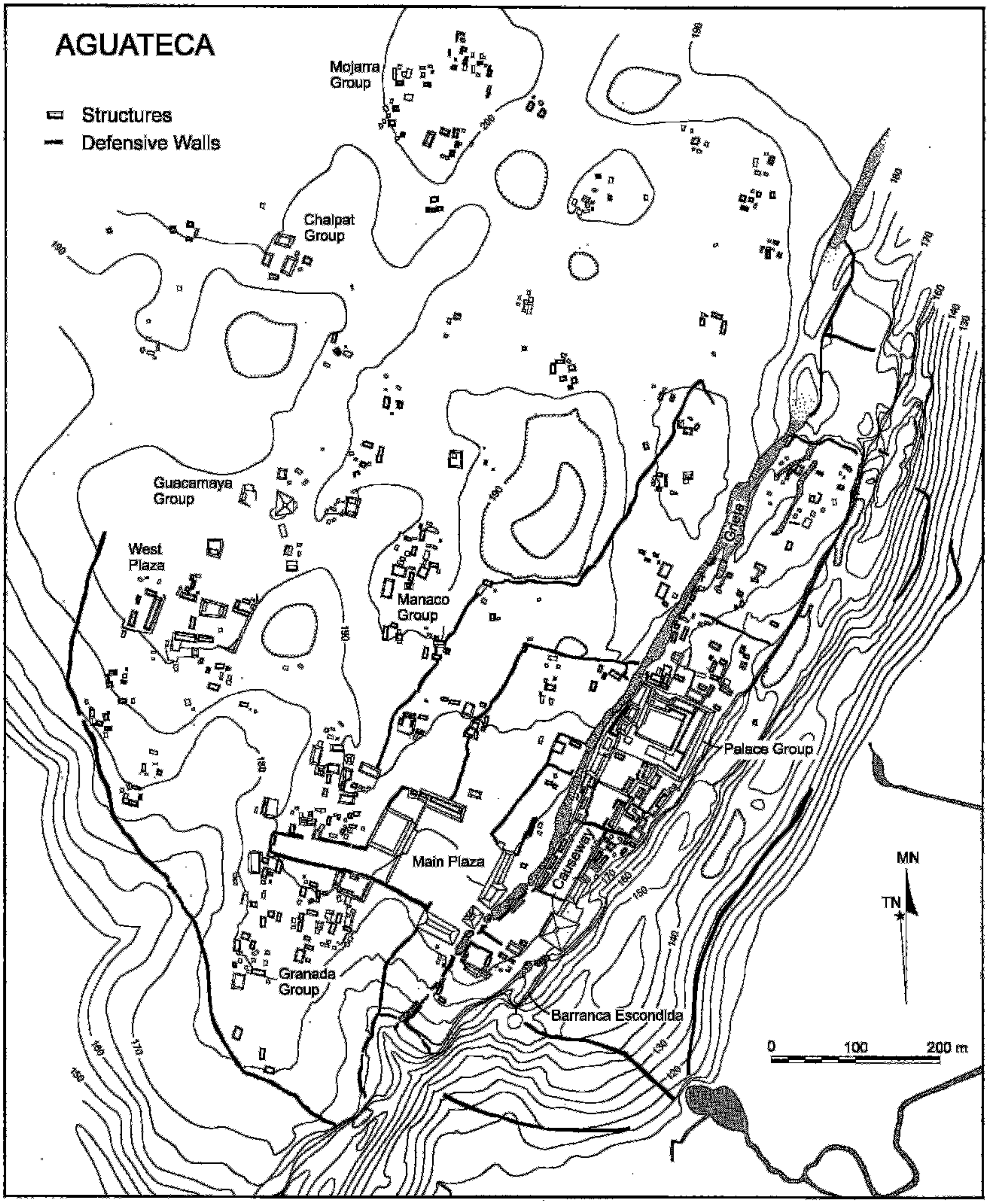


FIGURE 1.1. Map of Aguateca. 5-m contour intervals.

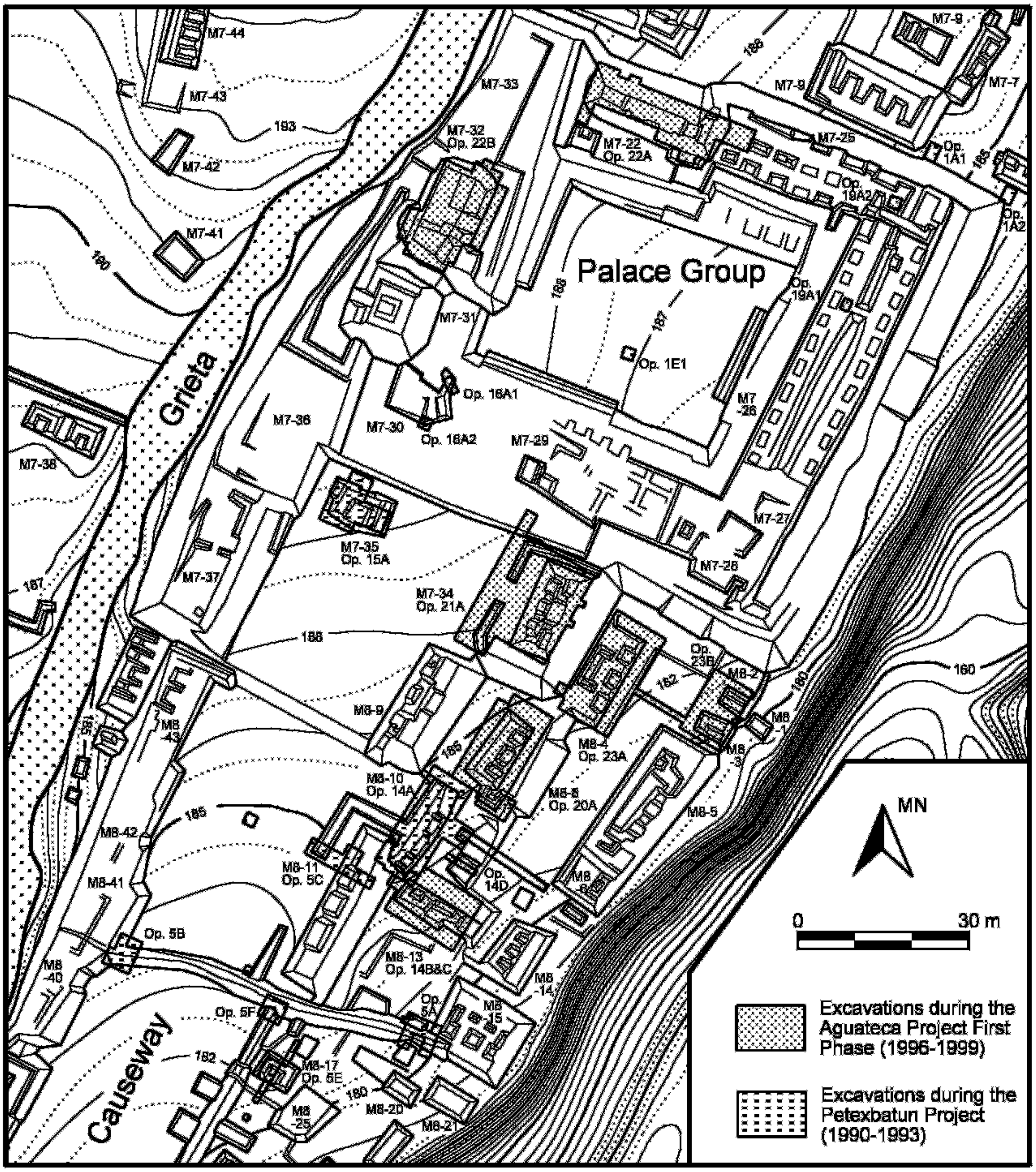


FIGURE 1.2. Map of the Palace Group and the Causeway with the areas excavated during the Petexbatun Regional Archaeological Project and the Aguateca Archaeological Project First Phase.

corresponding to 2-×-2-m grids. Levels describe stratigraphic divisions, with Level 1 referring to the humus layer, Level 2 to the wall-fall layer, Level 3 to on-floor artifacts, and Level 4 and beyond to strata below the last floor. Lots are flexible, arbitrary divisions within a unit and level, and may correspond to individual features, 1-×-1-m horizontal partitions, and the like. In the field, artifacts of different classes (for example, ceramic vessels, obsidian artifacts, non-obsidian chipped stone tools, figurines) were bagged separately, and we gave consecutive numbers within each suboperation to individual artifact bags for additional detailed provenience control. During lab analysis, catalog numbers were given to individual reconstructed objects, fragments belonging to the same object, individual

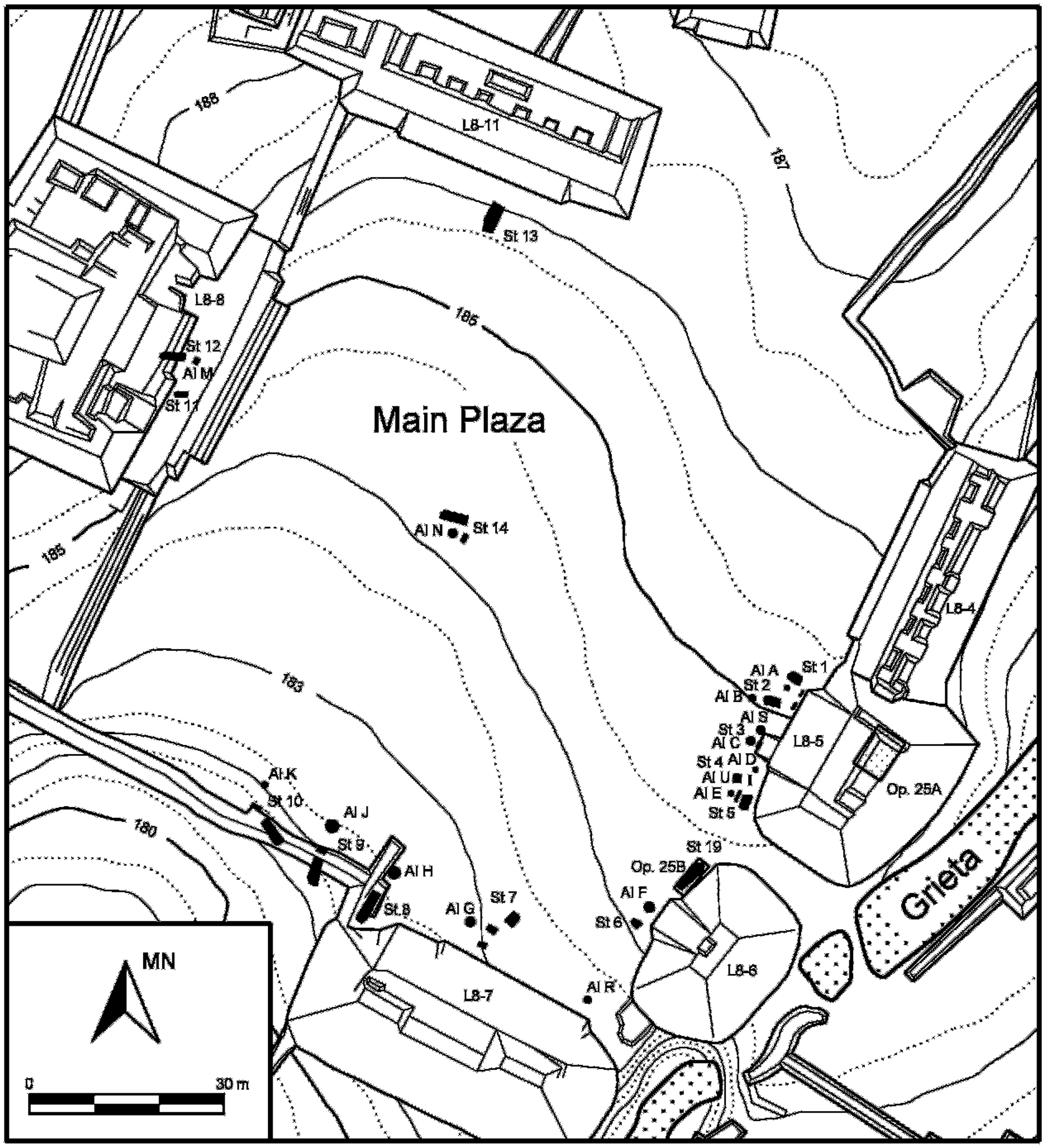


FIGURE 1.3. Map of the Main Plaza with the areas excavated during the Aguateca Archaeological Project First Phase.

fragments, or in the case of ceramics, groups of fragments sorted by types, forms, and other attributes. For most types of artifacts, a catalog number consists of the bag number followed by a hyphen and a consecutive number within the artifact number, although for faunal remains, consecutive numbers were given within each lot (e.g., Cat. 20A163-1). For ceramic vessels, we used unique six-digit numbers independent of artifact bag numbers, following the system established in the Petexbatun Regional Archaeological Project (Foias 1996). In addition, we gave whole artifact numbers for certain artifact types, which consist of consecutive numbers within each extensively excavated structure (e.g., "WVS No." refers to a whole artifact number for ceramic vessels).

Discussions in this book emphasize detailed descriptions of individual finds and their contextual information, but we also try to keep a balance with a more traditional approach of organizing finds into certain artifact types along with the use of quantified data. The latter strategy, common in the tradition of American archaeology, helps

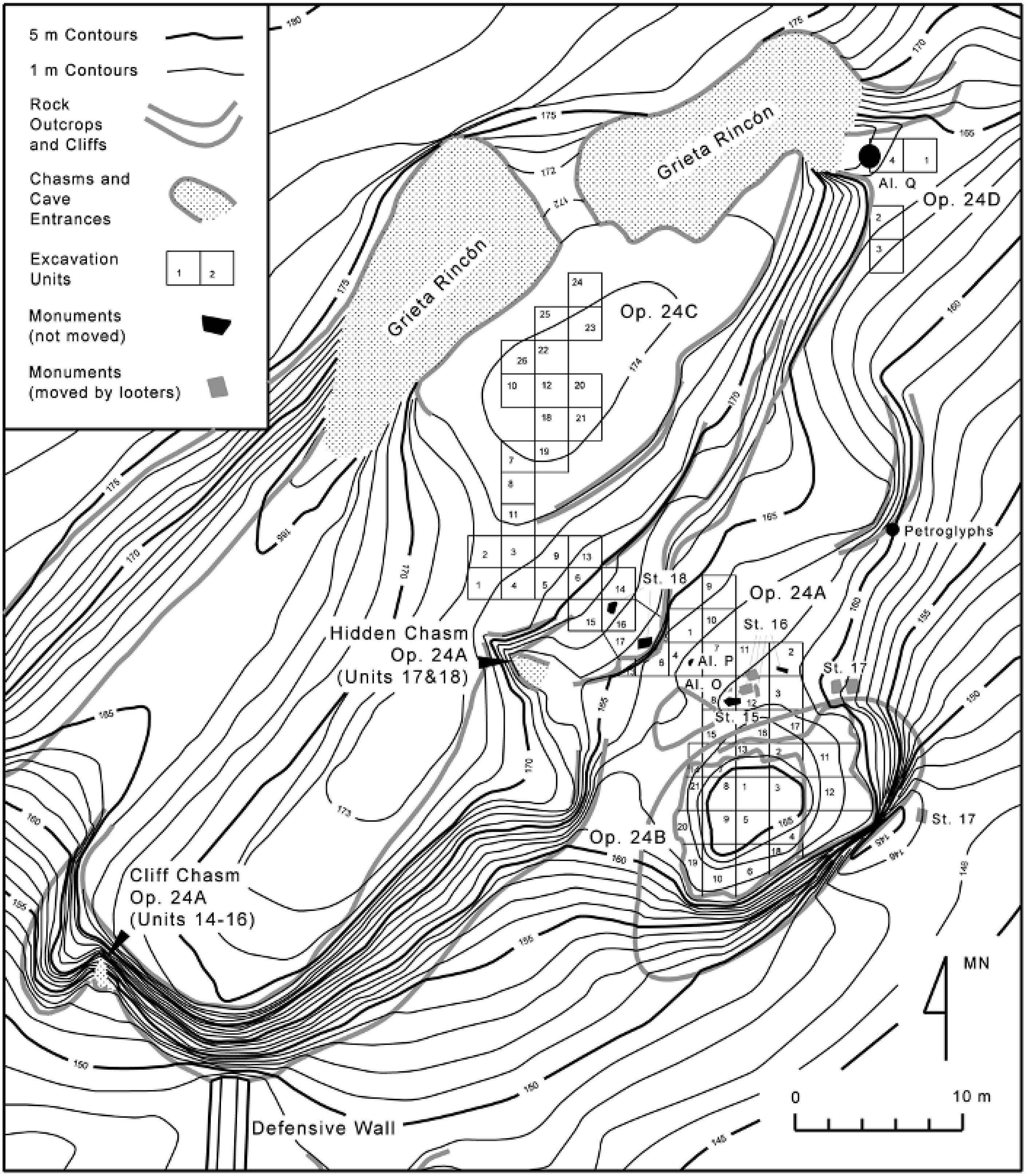


FIGURE 1.4. Map of the Barranca Escondida.

us to find certain "patterns" in the archaeological record. Under the influence of processual archaeology, in particular, such a strategy, which facilitates statistical analysis, was strongly promoted and descriptive approaches were condemned. The reduction of complex data into fixed categories, however, inevitably sacrifices the richness of the original finds and limits the possibilities for different approaches by other researchers. If we are to study diverse social relations and processes of negotiation among different individuals and groups, we need to pay closer attention to details and contexts, akin to the "thick descriptions" advocated by Clifford Geertz (1973) for ethnographic studies. Detailed descriptions of contextual information allow us to appreciate the subtleties and nuances of the finds and to facilitate the study of the dynamics, heterogeneity, and fluidity in social agents' practices and perceptions. Moreover, such descriptions provide a basis for open-ended approaches that permit different views and analyses by future scholars. The unique setting of Aguateca, resulting from rapid abandonment, especially deserves the most detailed descriptions that the economics of publication and the efficiency of presentation allow. To capture the richness and subtleties of the life of the Classic Maya and to make the best use of the unique data set of Aguateca, we strongly emphasized contextual descriptions of structure-by-structure and room-by-room finds, while keeping a necessary balance with categorical, quantitative approaches. For clear descriptions of our finds, illustrations are of primary importance. Most artifact drawings and photographs have a scale of ½ unless otherwise noted.

SETTINGS

Detailed descriptions of Aguateca's setting were presented in Volume 1, as well as in previous publications (Inomata 1995, 2007a), and here I furnish a brief overview. Aguateca is one of the major centers in the Petexbatun region and is located on top of an escarpment that overlooks Lake Aguateca and the Petexbatun River. Ancient settlements at Aguateca are found in a relatively flat terrain above the escarpment. The most characteristic geological feature at the site is the Grieta, a 70-m-deep chasm running parallel to the escarpment. The bedrock in most parts is very hard, and soils in the flat areas are shallow (10–30 cm).

We designed the Aguateca Archaeological Project First Phase by building on the results of the Aguateca Subproject (1990–1993 field work, 1994 lab work) of the Petexbatun Regional Archaeological Project (general director, Arthur Demarest). Following the Aguateca Project First Phase, our understanding of this site was further expanded by the Aguateca Restoration Project First Phase (1999–2000; director, Juan Antonio Valdés), Aguateca Restoration Project Second Phase (2002–2004; director, Inomata), and Aguateca Archaeological Project Second Phase (2004–2005 field work, 2006 lab work; director, Inomata; co-directors, Triadan, Ponciano, and Aoyama) (Inomata et al. 2009, 2012).

Evidence of the earliest occupation at Aguateca dates to the Late Preclassic period (Faisan ceramic phase, 300 BC–AD 250). Large platforms found in the Guacamaya Group in the western part of the center were built during this period. The Early Classic period (Jordan ceramic phase, AD 250–600), however, is poorly documented. Although the chronology of this era is still problematic, Aguateca appears to have been nearly deserted. The Petexbatun region was probably dominated by the dynasty seated at the twin capitals of Tamarindito and Arroyo de Piedra during the late part of the Early Classic period.

The political landscape of the region transformed with the arrival of a Tikal royal personage, Bajlaj Chan K'awiil, at Dos Pilas at the beginning of the Late Classic period. This center became an important political power while Tamarindinto apparently continued to control the area around Aguateca during the early facet of the Nacimiento ceramic phase (AD 600–720). The Tamarindito dynasty appears to have been responsible for the erection of monuments at the Barranca Escondida, located to the south of the Main Plaza of Aguateca. The Dos Pilas dynasty, however, took over the area around Aguateca and turned it into its secondary capital during the middle facet of the Nacimiento phase (AD 720–761). After the probable military defeat, the Dos Pilas elite abandoned its primary center and settled at Aguateca on a more permanent basis during the late facet of the Nacimiento phase (AD 761–810). Toward the end of the Late Classic period, warfare in the area escalated, and the residents of Aguateca under the reign of the last ruler, Tahn Te' K'inich, tried to defend themselves by building a series of concentric stone walls. It appears that Tahn Te' K'inich and his family evacuated their residences in the Palace Group as the situation deteriorated, and Aguateca was attacked by enemies around AD 810. Its central part, where the elite households lived, was burned, and the entire center was deserted. The floor assemblages left in these burned buildings, as well as the royal storage room and termination ritual deposits in the Palace Group, were the primary focus of our project.

PART A

Artifacts, Ecological Studies, and Conservation

chapter

2

Figurines

Daniela Triadan

The artifacts uncovered during the extensive excavations of the project include 703 figurines and figurine fragments, most from rapidly abandoned elite residential structures and/or associated refuse contexts and middens (Table 2.1). Inomata previously recorded and analyzed 317 figurines (Inomata 1995:Table 7.12). Thus, at the end of the first phase of the Aguateca Archaeological Project, a total of 1,020 partial, reconstructible, and whole figurines had been excavated. In 1999 and 2000, a Guatemalan restoration project recovered an additional 111 figurines (Valdés et al. 2001), and we found additional figurines and fragments during the second phase of the project (Triadan 2006a). Therefore, the total number of figurines and figurine fragments from Aguateca has now reached 1,505, but the analysis presented here is based on only the 703 from the First Phase of the Aguateca Project.

This number includes indeterminate fragments that cannot be classified as to their motif or function. Of these, 86 were probably complete at abandonment and were found in situ.

Methods of Analysis

All figurines and fragments were visually inspected and classified. Every complete and reconstructible figurine, as well as every fragment that could not be matched with other fragments or partial or reconstructible figurines, was then given a catalog number during the analysis. In this way the number of discrete individual figurines, whether they were complete, partial, or small fragments, could be established for every operation and for different contexts within the operation. I recorded the provenience (northing, easting, and elevation, and point provenience for complete and reconstructible figurines from in situ floor contexts), weight and dimensions (largest dimension and maximum diameter), the state of completeness (complete, broken [fragments, not very complete], and almost complete [was probably complete at time of abandonment]), and classified all fragments and more complete specimens by possible function and morphology or motif when possible. Specimens that could not be classified by function and motif were recorded as indeterminate.

I recorded additional information on whole and reconstructible figurines on an extended figurine form. The form recorded the catalog number; the original provenience (bag number and lot information); context information (floor, burial, special deposit, or other); provenience of pieces that belonged to the figurine but came from different bags; condition (complete, broken but reconstructible, or partial); coordinates; provenience description; function; a description of and observation on the paste and firing, including Munsell color; information on reconstruction and conservation of the piece (what treatments and materials were used); a sketch of the figurine; and whether it was photographed and/or drawn. Thus, a detailed descriptive record was created for each whole or reconstructible figurine. All complete and reconstructible figurines were drawn and photographed, and all heads and torsos were drawn and most of them photographed. As in the approach we took with the ceramics, I attempted to reconstruct all fragmentary figurines as completely as possible by analyzing the complete figurine assemblage of an operation at the same time. I also searched for matches of fragments between different operations.

Results of Analysis

All the figurines date to the Late Classic period, and the majority probably to the later part of the Late Classic or the middle and late facets of the Nacimiento phase (AD 720–810). Most are what Butler (1935:641–652) defined as X-style. They range from about 4 cm to 29 cm in height with the majority between 4 cm and 8 cm. They are similar to the Late Classic figurines found at other sites

Table 2.1. In situ and Discarded (Refuse) Figurines per Operation.

Operation (Str. No.)	No. Complete at Abandonment	%	No. Fragments (Refuse)	%	Total No. of Figurines	% of All Figurines
14A (M8-10)	0	0	1	100	1	0.14
14B (M8-13)	7	7.37	88	92.63	95	13.51
14C[a]	0	0	3	100	3	0.43
14D[a]	0	0	1	100	1	0.14
20A (M8-8)	16	26.23	45	73.77	61	8.68
21A (M7-34)	8	29.63	19	70.37	27	3.84
22A (M7-22)	4	4.65	82	95.35	86	12.23
22B (M7-32)	0	0	47	100	47	6.69
23A (M8-4)	37	16.59	186	83.41	223	31.72
23B (M8-2+M8-3)	14	9.34	136	90.66	150	21.34
24A[b]	0	0	3	100	3	0.43
24B[b]	0	0	1	100	1	0.14
25B	0	0	1	100	1	0.14
26A[b]	0	0	1	100	1	0.14
26B[b]	0	0	2	100	2	0.29
27A[b]	0	0	1	100	1	0.14
Total	86	12.23	617	87.77	703	100.00[c]

[a] Plaza trench.

[b] Excavations in middens only.

[c] Does not equal 100% (99.86) because of rounding.

in the Maya Lowlands (see, e.g., Brainerd 1958; Schlosser 1978; Willey 1972, 1978; Halperin 2008). At Aguateca we have not found any fine paste Terminal Classic figurines like the Jimba phase ones from Altar de Sacrificios (see Willey 1972).

All the figurines we excavated are from domestic contexts, either from floors in and around rapidly abandoned houses or from refuse contexts or middens, in most cases associated with those structures (Table 2.1). (However, in 1991 Inomata found 14 figurine fragments in Structure M8-17, which he interpreted as a possible shrine [Inomata 1995:190–195].) This seems to be typical for the Late Classic central Maya Lowlands, as the same pattern occurs at other sites along the Pasión River, such as Ceibal (Willey 1978), Altar de Sacrificios (Willey 1972), and Piedras Negras (Coe 1959). In clear contrast to the famous site of Jaina (Piña Chan 1968), we have found practically no figurines in burials, which is true for most Classic lowland sites (Brainerd 1958; Willey 1972, 1978; Coe 1959; Hammond 1975; Smith 1955; but see Freidel et al. 2010).

Manufacture

Most figurines were mold-made and are hollow. They were manufactured by pressing clay into a mold or molds that form the frontal part. The back was probably formed freely and then attached to the leather-hard, molded frontal piece. Some of them then had modeled elements added. A few solid figurines were modeled, but because they are fragmented and lack their heads, I could not determine whether their faces were mold-made or modeled. (The modeled Jaina figurines had faces made in a mold.)

The figurines have predominantly a buff to light orange-red paste (e.g., 7.5YR 7/4 and 5YR 6/6) with fine carbonate temper and small ferruginous nodules that are most likely hematite. Most were probably locally made, as these pastes are typical for Aguateca (Inomata 1995:549; Foias 1996; Foias and Bishop 1997:278–283), and we have found molds for figurine heads in domestic contexts (Figure 2.1, Table 2.2). Another argument for local manufacture is the fact that we found several figurines made from the same mold, some in different structures (see Figures 2.7a, b, c; 2.10b, c, d).

The figurines are unslipped, but some have paint remnants. Red is the most common color, but some also show Maya Blue and several shades of red and gray (see, e.g., Figure 2.4d). The back of one figurine was painted with specular hematite (Cat. 23A264-1, Figure 2.6).

Functions

Following the scheme that Inomata had developed (Inomata 1995:548–552, Table 7.12; 2008a:198–210, Tables 5.12–5.15), I classified the figurines into 23 possible functional

Table 2.2. Frequencies of Figurine Functions.

Function	No. of Figurines
Whistles	111
Whistles with multiple resonators	12
Probable whistles	256
Flutes	16
Double flutes	1
Bells	5
Clappers	6
Figurines	10
Hollow-heads	8
Molds	5
Pendants	1
Vessels	2
Indeterminate	270
Total	703

categories: (1) figurine (not flute or whistle), (2) flute (long musical instrument), (3) whistle (round musical instrument with a simple resonator), (4) curled whistle (round musical instrument with a complex shaped resonator), (5) other type of whistle, (6) whistle, type unknown (small fragments), (7) hollow-head figurine, (10) mold, unclear, (11) mold for figurine, (12) mold for flute, (13) mold for whistle, (14) figurine or whistle, (15) whistle with multiple resonators (3 is most common), (16) pendant, (17) vessel shape, (18) bell (usually associated with category 19), (19) clapper (usually associated with category 18), (20) whistle with double resonator, (21) ornament, (22) double flute, (99) unclear. Not all functional classes were actually encountered in the figurines excavated during the first phase of the project. "Figurine" (1) is a smaller classificatory group that includes pieces other than musical instruments. The distinction between whistles and other types of figurines is sometimes difficult to make for small fragments. When a specimen retained a considerable portion of the original piece (such as an entire head part), it was usually classified as figurine or whistle (14), but most of these were probably whistles (category 3) and are listed as such in Table 2.2.

Most of the figurines found in and around the elite residences at Aguateca are musical instruments (see also Stöckli 2007); few are solid figures (Figure 2.2). The majority are small whistles with one resonator chamber and two stops of the same size on the back (functional category 3; Figures 2.3–2.14), producing three different notes. These three-tone whistles are often called *ocarinas* (Hammond 1972:226; Healy 1988:30). The mouthpiece is usually on the bottom of the backside, and together with the front legs it forms a tripod so that the figure can stand up (e.g., Figures 2.4b, 2.13b). We also found some whistles with two or three round resonators in a row that function like a flute (functional category 15; Table 2.2; Figures 2.15, 2.16). The mouthpiece is on one end, and there are usually four stops, two on each side of the second and third resonator, allowing multiple notes. These whistles are blown from the side. They normally have a human or animal head attached to the middle resonator, which faces the audience when played. The faces of these personages and creatures were probably mold-made, and other parts such as the ear ornaments and headdresses were modeled.

The third category of musical instruments is flutes (functional category 2, Table 2.2.). They are long hollow tubes with multiple stops and a mouthpiece that functions like the one on a modern recorder. Figure 2.17 shows a complete instrument with six stops. These flutes have small animal or human figures appliquéd to their upper part (Figure 2.18). Their faces were probably mold-made, while other parts such as arms and headdresses were modeled (Figure 2.17). We also found a fragment of one double flute (functional category 22, Figure 2.18f).

In addition to these wind instruments, we found five clay bells with clappers (functional categories 18 and 19; Figures 2.19, 2.20) (Triadan 2006b, 2007:275). Three of these bells depict felines that may be dead, as indicated by their closed eyes. All are Chablekal Fine Gray and were imported into the site. I originally thought that they were parts of small Chablekal Gray bowls (see Figure 8.11 of Volume 1), but realized during their reconstruction that their shapes were quite different. They were actually bells in the form of animal heads, and the "long ceramic pendants" found in association with all of these animal heads were actually bell clappers. All the bells came from Structure M8-4 (see below). To my knowledge, no one else has reported similar artifacts in the Maya area, including the greater Palenque region, which is one of the proposed production zones for Late Classic Fine Gray ceramics (Bishop 2003:85–89). Some long ceramic pendants that are very similar to the Aguateca clappers have been found at Piedras Negras recently, and Coe (1959:71, Figure 59e) reported one from earlier excavations at that site. They are not made of Fine Gray paste, however. Terminal Classic ceramic bells are reported from the Pacific Coast at the site of Finca El Paraiso, Quetzaltenango. At least one of them is plumbate (Shook 1947:179–184; see also Shepard 1948:126).

Figurines of nonmusical function include a type that we classify as hollow-head figurines (functional category 7; Table 2.2., Figure 2.21). They are the hollow heads of males, supernaturals, or animals that have a wide opening, like a helmet. They have holes in their eyes and around the neck or ears. Their function is not clear, but they may have been masks for larger figurines. We also have two small vessels shaped as grotesque faces (Figure 2.22a) and one moldmade monkey head pendant (Figure 2.22b, Table 2.2).

Motifs

I classified the figurines into 65 different motifs based on their morphology and iconographic representation, again following Inomata's (1995:Table 7.12) original classification scheme and expanding on it. Codes were devised so that more specific subcategories could be added during the analysis (Table 2.3). Not all the motifs listed in Table 2.3 were actually encountered in the figurines excavated by the project.

At Aguateca, three classes of beings are represented: humans (both male and female), animals, and supernaturals and grotesques. Of all the figurines, 250 (35.56 percent) can be identified by motif. The majority (70 percent, n = 175) are humans, 23.6 percent (n = 59) are animals, and 6.4 percent (n = 16) are grotesques and supernaturals (Table 2.4). Each of these larger classes can sometimes be subdivided according to their accouterments. During this phase of the project, we did not find any plant-like motifs.

Of the male figurines that were probably complete at abandonment and found in situ, about one-third (32.26 percent, n = 10) are warriors (Figures 2.3–2.5.). This proportion remains the same, 33.33 percent, when all male figurines are taken into consideration. The warriors are all standing, typically carrying a round, key-hole-shaped or square tasseled shield and some type of weapon (see Figures 2.3, 2.4). They usually wear elaborate headdresses, often incorporating animals or monsters. Some wear quilted armor or feathered suits (Figures 2.5b, c; see also Tozzer 1941:121–122). Rather than depict warriors in actual battle dress, the figurines may represent warriors in elaborate ritual garments, used during ceremonial reenactments of battles. One wears a fat-man mask (Figure 2.3a). (Halperin [2008:183, 198–201, Figure 7.20c–e] classifies figurines with a "textured body suit" found at Motul de San José as supernaturals, specifically the "fat god." Thus she would probably have classified Cat. 425-1 in Figure 2.5c as a fat god.) Among nonwarrior figurines, some have rich and elaborate attire, with large and elaborate headdresses, and normally wear a loincloth or skirt-like garment, bracelets, and anklets (Figures 2.6, 2.7). Others have simple attire, including two old men (Figure 2.8), although the figurine shown in Figure 2.8g may be a depiction of the "old god." We also found two ball players, one wearing an owl mask (Figure 2.9). Most male figurines are standing, but some are seated. The differences in the attire of the figurines may indicate differences in social status or sociopolitical context.

Women are also depicted in both elaborate and simple attire (Figures 2.10, 2.11). Of the in situ female figurines that were probably complete at abandonment, 26.66 percent (n = 4) are richly dressed and accoutered. This proportion remains more or less the same, 28.13 percent, when all female figurines are taken into consideration. They are clothed in *huipiles* with intricately woven designs and fringed skirts or shoulderless dresses, carry round fans, and often wear elaborate headdresses (Figure 2.10a, b). Other women wear much simpler attire, often a simple dress and a very simple headdress or hat (Figure 2.11a), or no head covering. Typically the women of both categories have a stepped hairdo (see Robertson 1985) and wear ear spools, multi-strand bracelets, and double-row necklaces that hang down between their breasts (Figures 2.10, 2.11). The most common pose is seated or kneeling. A few women are carrying a child, animal, or idol (Figure 2.11). One is clearly depicted advanced in age, with wrinkles and sagging breasts (Figure 2.11d). As with the males, the differences in attire may signal differences in social status or sociopolitical context.

The majority (85 percent, n = 149) of the human figurines, including all the females, are small, single-chamber whistles. Among the males, in addition to the single-chamber whistles (80.3 percent, n = 53), seven are solid figurines, three are hollow-heads, two are whistles with three resonators, and one was attached to a flute. For the rest (n = 13), a functional type could not be determined.

Animals include monkeys, birds, rodents, deer, bats, dogs, coatis, and snakes (Table 2.5, Figures 2.12, 2.13). Monkeys are the most common (22.03 percent, n = 13) and occur most frequently appliquéd on flutes, as three-chambered whistles, as masks, and as semi-humans (Figure 2.12k–n). Owls are the second most frequent animals (15.25 percent, n = 9) and are always single-chamber whistles (Table 2.5, Figure 2.12a–h). The other animals occur in smaller numbers (see Table 2.5).

Depictions of supernaturals and grotesques are almost exclusively the "fat man" or "fat god" (Figure 2.14) (Miller and Taube 1993:86). In a few cases they are actually humans wearing "fat man" masks (e.g., Figure 2.14d). Eight of these figurines were probably small, single-chamber whistles; two were hollow-heads; one was a three-chambered whistle; three were on flutes; and two were vessel-shaped.

TABLE 2.3. Figurine Motifs.

CODE NO.	DESCRIPTION
100	Anthropomorphic, unclear
101	Male, unclear
110	Male with simple clothes (upper body naked)
111	Male with a fat-man mask
112	Male with a monkey mask
113	Male with a grotesque-face mask
114	Male with a headdress
120	Male with noble attire, not warrior
121	Male with a human-face headdress
122	Male with a grotesque-face or monster headdress
123	Male with a feline headdress
124	Male, musician
125	Seated male
130	Warrior, unclear
131	Warrior without mask or headdress
132	Warrior with padded armor
133	Warrior with feathered armor
140	Warrior with a mask, unclear
141	Warrior with a bird mask
142	Warrior with a monkey mask
143	Warrior with a grotesque-face mask
144	Warrior with a fat-man mask
150	Warrior with a headdress, unclear
151	Warrior with a simple helmet
152	Warrior with a large headdress
153	Warrior with a monster headdress
154	Warrior with a bird headdress
155	Warrior with a monkey headdress
156	Warrior with a deer headdress
157	Warrior with a bat headdress
158	Warrior with a snake headdress
160	Female, unclear
161	Female with a headdress
162	Female with a hat
165	Female with noble attire
166	Female with noble attire and monster headdress
167	Female with simple attire
168	Female with shawl
170	Adult and child, unclear
171	Male and child
172	Female and child
173	Female holding idol (doll? figurine?)
174	Female holding some kind of animal
180	Human with bird mask
190	Double figure, woman and half-animal person
200	Half-animal person or deity
300	Zoomorphic, unclear
310	Bird, unclear
311	Owl
312	Other bird
315	Pizote (Coati)
320	Monkey
330	Dog
340	Bat
350	Deer
360	Feline
370	Frog
380	Rodent, unclear
390	Reptile, unclear
391	Snake
400	Deity, unclear
410	Long-nose deity
500	Grotesque head or monster
510	Fat man
515	Ball player
516	Ball player with owl mask
520	Old man
530	Monster
600	Plant
800	Geometric form
810	Long, partially hollow conical shape
999	Unclear (for small fragments)

TABLE 2.4. Frequencies of Figurine Motifs.

MOTIF	NO. OF FIGURINES
Male	66
Female	32
Anthropomorphic	77
Animal	59
Supernatural	2
Grotesque	14
Indeterminate	453
Total	703

TABLE 2.5. Animal Representations.

TYPE OF ANIMAL	NO. OF FIGURINES
Monkey	13
Owl	9
Bird	4
Dog	3
Feline	3
Deer	4
Rodent	4
Bat	1
Coati	1
Frog	1
Snake	1
Indeterminate	15
Total	59

Distributions

We found figurines and figurine fragments in and around all the excavated structures (see Chapter 1), albeit in varying quantities. Most are fragments from refuse deposits, but the rapidly abandoned structures all have in situ figurines that were probably complete at abandonment and left behind in either use or storage contexts (Table 2.1). For this analysis, I considered all figurines found in situ to be complete at the time of abandonment even if they were not 100 percent reconstructible. We also found a few figurine fragments in the chasm (Operations 24A and B) and in test excavations in middens around Structure L8-5 (Operation 25B), Group L8-9 (Operation 26A), Group L-8-8 (Operation 26B), and Group K8-3 (Operation 27A) (see Table 2.1).

Structure M7-22 (House of Masks)

At Structure M7-22, part of the Palace Group, we found a total of 86 figurines (Table 2.1). The majority (95.35 percent) were fragments found in front of and around the sides of the building in refuse contexts mixed within a thick layer of burned ceramics and other objects that we interpreted as ritual termination deposits. There were only four figurines that were probably complete at the time of abandonment, all associated with the easternmost room of the structure, where the royal family appears to have stored some of their belongings. The four figurines were two males, one female, and one animal (see Figure 2.23).

Structure M7-32 (House of Bones)

All 47 partial figurines and figurine fragments recovered from Structure M7-32 came from ritual termination deposits in front of and inside the central part of the building (Table 2.1). We found no figurines that were potentially complete at abandonment and left in situ in and around this structure.

Structure M8-4 (House of Mirrors)

Structure M8-4 had by far the largest number of figurines and figurine fragments ($n = 223$), almost a third (31.72 percent) of all recovered figurines and fragments (Table 2.1). It also had the greatest number of figurines that were probably complete at abandonment ($n = 37$), more than double the quantity found in the other elite residence of that residential group, Structure M8-8 (House of Axes). Interestingly, Structure M8-4 also had the most animals. We found eight males, five females, 14 animals, and four grotesques (Figure 2.23). We also found two molds for figurine heads. The majority came from the front part of the north room and the exterior space to the north of the north room. This distribution correlates with a high density of ceramic storage and cooking vessels and grinding stones. Several ceramic drums, turtle carapaces, and most of the spindle whorls were also found in this area.

Structure M8-8 (House of Axes)

In and around Structure M8-8 we found 16 figurines that were probably complete at abandonment (Table 2.1). There were six males, four females, three animals, one supernatural, and two grotesques (Figure 2.23). These figurines came predominantly from the north room and the exterior space at the back of the structure. Like Structure M8-4, the north room is associated with numerous storage and cooking vessels, and the northern and back areas of the structure are where we found most of the ground stone. The figurines were also associated with two turtle carapaces and spindle whorls.

Structure M8-13

In and around Structure M8-13, we found seven figurines—four males and three animals—that were probably complete at the time of abandonment (Table 2.1, Figure 2.23). They came mainly from inside, the front, and the back of the center room. One figurine was found in the west room. In this structure the figurines, as well as the spindle whorls, are predominantly associated with the center room and not with the west room, which had most of the storage and cooking vessels. One ceramic drum was also found in front of the central room. Another drum and one spindle whorl were inside the west room. We also recovered many partial figurines, figurine fragments, and one complete figurine from a midden right outside the western wall. In fact, 92.63 percent of the figurines came from this midden (see Table 2.1). It should be noted that a significant quantity of this material may have washed down from a midden next to the adjacent Structure M8-10, and thus not all the fragments may be associated with the household of Structure M8-13.

Structures M8-2 and M8-3

In and around Structures M8-2 and M8-3 we recovered 13 figurines that were probably complete at abandonment (Table 2.1): six males, three females, three animals, and one grotesque (Figure 2.23). The figurines were found in front of Structure M8-3, between the two structures (the back of M8-3 is the front of M8-2), behind the northwest corner of Structure M8-2, and one inside M8-2 near the back wall. Five spindle whorls were found in the same areas, and a ceramic drum was on the C-shaped bench of Structure M8-3.

Structure M7-34 (House of Metates)

In and around Structure M7-34 we found eight figurines that were probably complete at abandonment and left in situ (Table 2.1). Five are males, two are females, and one is an animal (Figure 2.23). The majority were found in front of the structure, where we also found seven ceramic drums. The majority of spindle whorls were also found in front of the structure.

In addition, as mentioned, small quantities of figurines were recovered from the test excavations in the chasm and around Structure L8-5, as well as in middens around Groups L8-8, L8-9, and K8-3 (see Table 2.1).

Conclusion

As a general pattern, the figurines seem to be associated with one of the side rooms and/or back exteriors of the structures, areas that usually contain high quantities of ceramic storage and cooking vessels, ground stone, and spindle whorls (Inomata and Stiver 1998; Inomata et al. 2002). The center rooms of the structures are usually relatively devoid of artifacts but have ceramic serving vessels, such as plates and polychrome cylinders, and sometimes scribal implements. The other side rooms exhibit evidence of crafting activities.

The figurines are also associated with other musical instruments such as turtle carapaces, ceramic drums, and in some cases, bone rasps. Furthermore, every excavated residential structure contained an *assemblage of warriors, men, women, and animals* (Figure 2.23). However, even though all these general types of personages and animals were represented, each assemblage was unique and no two contained identical motifs (see Figure 2.24 for some of the figurines in the assemblage of Structure M8-8).

An important finding is that at Aguateca there are twice as many male as female figurines, and this ratio is consistent for figurines that were probably complete at abandonment as well as all excavated figurines from all contexts. Of the 86 figurines that were probably complete at abandonment and found in situ, 31 were males and 15 females; of all figurines, 66 were males and 32 females. This pattern also holds at the level of individual structure assemblages; all these assemblages have more males than females (see Figure 2.23).

The most frequent animals are monkeys and owls. Interestingly, they occur in different forms. The owls are always small single-chambered whistles, and the sound of these whistles resembles that of owls. Owls are associated with warfare in Maya iconography (see e.g., Grube and Schele 1994). Monkeys occur most frequently on flute-like instruments and are often depicted in human-like poses and with fancy headdresses. Rather than being represented in their natural animal state, they may be shown imbued with special powers, unlike any of the other animals that occur as figurines. In the *Popol Vuh*, the monkey twins are described as tricksters but are also the patron deities of artisans and musicians (Tedlock 1996:105, 124).

A large number of figurine fragments (n = 617, 87.77 percent) were found in middens associated with dwellings, which indicates frequent breakage and a utilitarian function (Table 2.1; see also Inomata 1995:688, 793, Table 8.1). The majority of these fragments cannot be classified as to specific motifs, but most were whistle parts. The high occurrence of figurine fragments in house middens argues against a purely ritual function, where we would expect curation and potential heirloom behavior to decrease their quantity in the refuse (see also Stöckli 2007), unless breaking the figurines was itself part of the ritual. However, we find neither consistent breakage patterns nor a tendency for specific figurine parts, such as heads, that might have been broken off during ritual destruction. An exception may be the figurines from Structure M8-17, excavated in 1991. Structure M8-17 was probably a shrine (Inomata 1995:190–195). Fourteen figurine fragments were found in this structure, and six more in a midden behind the structure, which was probably associated with a low platform, Structure M8-54 (Inomata 1995:697). Thus, these figurines may have been used in rituals. Interestingly, the majority were figurines rather than whistles (Inomata 1995: 550–551, Table 7.14), in contrast to the figurines from the elite residences. However, even in this context, few supernatural representations were found.

Given their association with side rooms that contained artifacts used for food preparation and storage, as well as most of the spindle whorls found in each structure, figurines seem to be related to activities carried out by the women and children of the household. The two molds that were found in Structure M8-4 may indicate that women were making figurines. Most figurines are whistles, and they occur together with other musical instruments, suggesting that they were used for playing music in a domestic setting (see also Stöckli 2007) and maybe as toys for

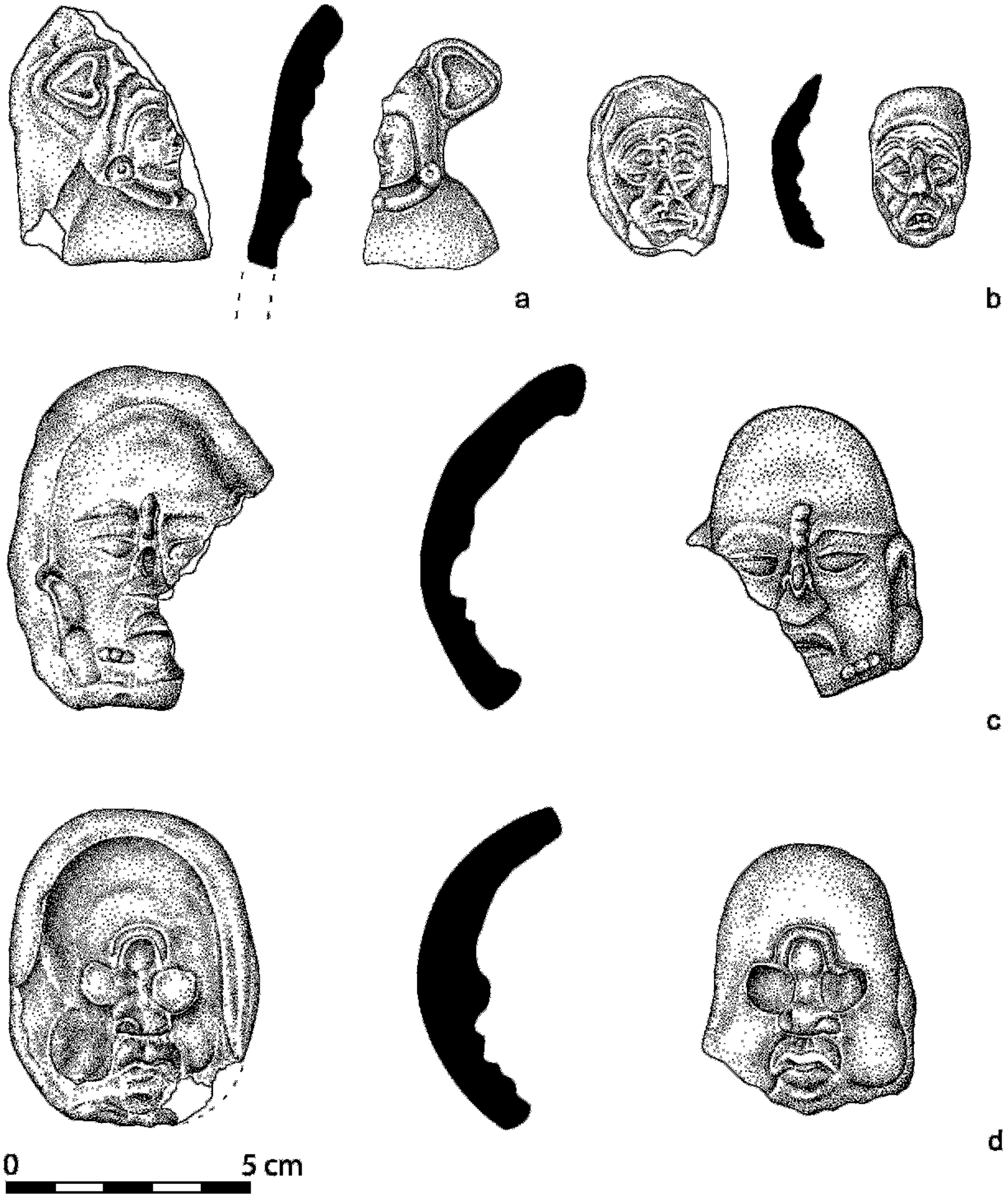


Figure 2.1. Figurine molds. (¾ scale) (a) Male with animal headdress (21A2-2-1, Cat. 1484-1). (b) Grotesque face (23A43-3-5, Cat. 1641-1). (c) Male head with scarification (21A3-2-1, Cat. 405-1). (d) Fat man mask (23A32-3-3, Cat. 1491-1).

children (e.g., Ruscheinsky 2003). Given the small scale of the figurines, these performances probably took place in an intimate setting and may have involved theatrical elements, as the figurines face the audience when played. It is also clear that each household had its own set of figurines that were not duplicated among other households. Figurines of warriors and elite women in formal ritual attire may have been used as role models for children, and they may also show elite women's perspectives on social roles in Aguateca (for a more detailed discussion, see Triadan 2007).

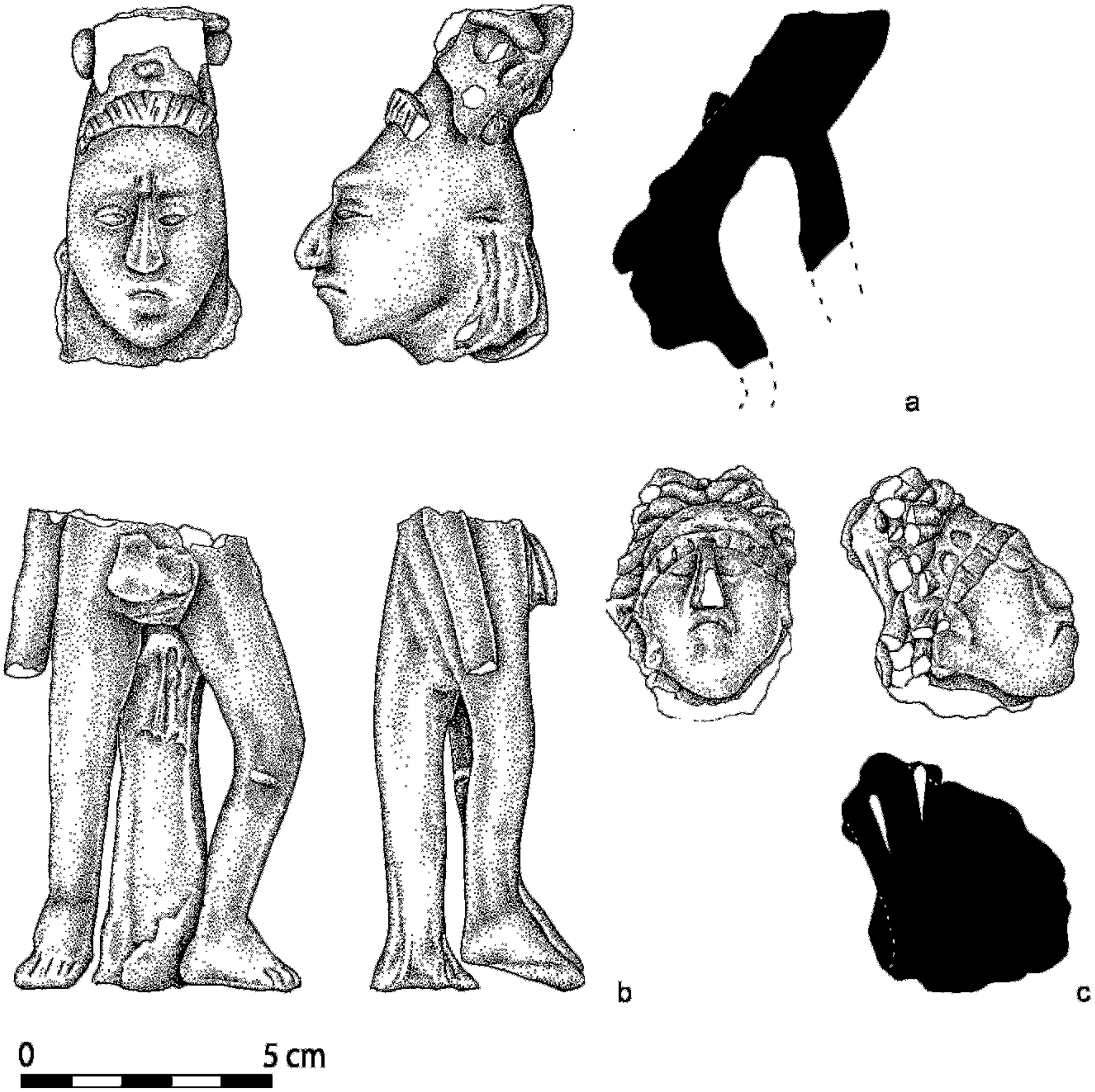


Figure 2.2. Solid figurines. (¾ scale) (a) 23A41-3-5, Cat. 952-1. (b) 23A55-3-2, Cat. 1769-1. (c) 14A6-4-2, Cat. 125-1.

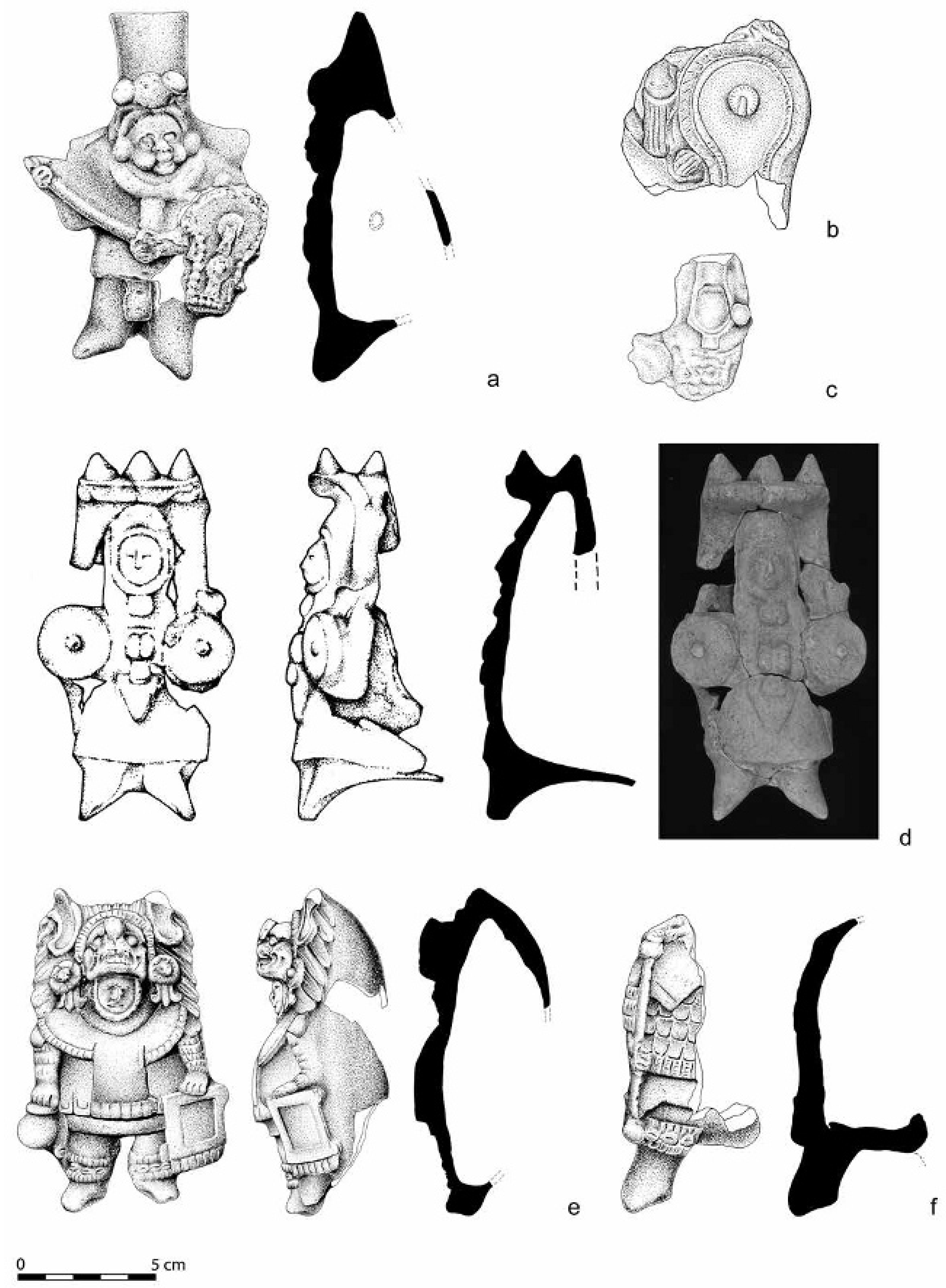


FIGURE 2.3. Whistles, warriors. (a) With fat-man mask and keyhole-shaped shield (20A17-2-3, Cat. 818-1). (b) With keyhole-shaped shield and trophy head (22B47-3-3, Cat. 678-1). (c) With round shield (23B5-3-4, Cat. 392-1) (d) With double round shields (20A17-3-1, Cat. 901-1). (e) With bat headdress square shield and manopla (20A22-3-1, Cat. 1209-1). (f) 14B19-1-1, Cat. 618-1.

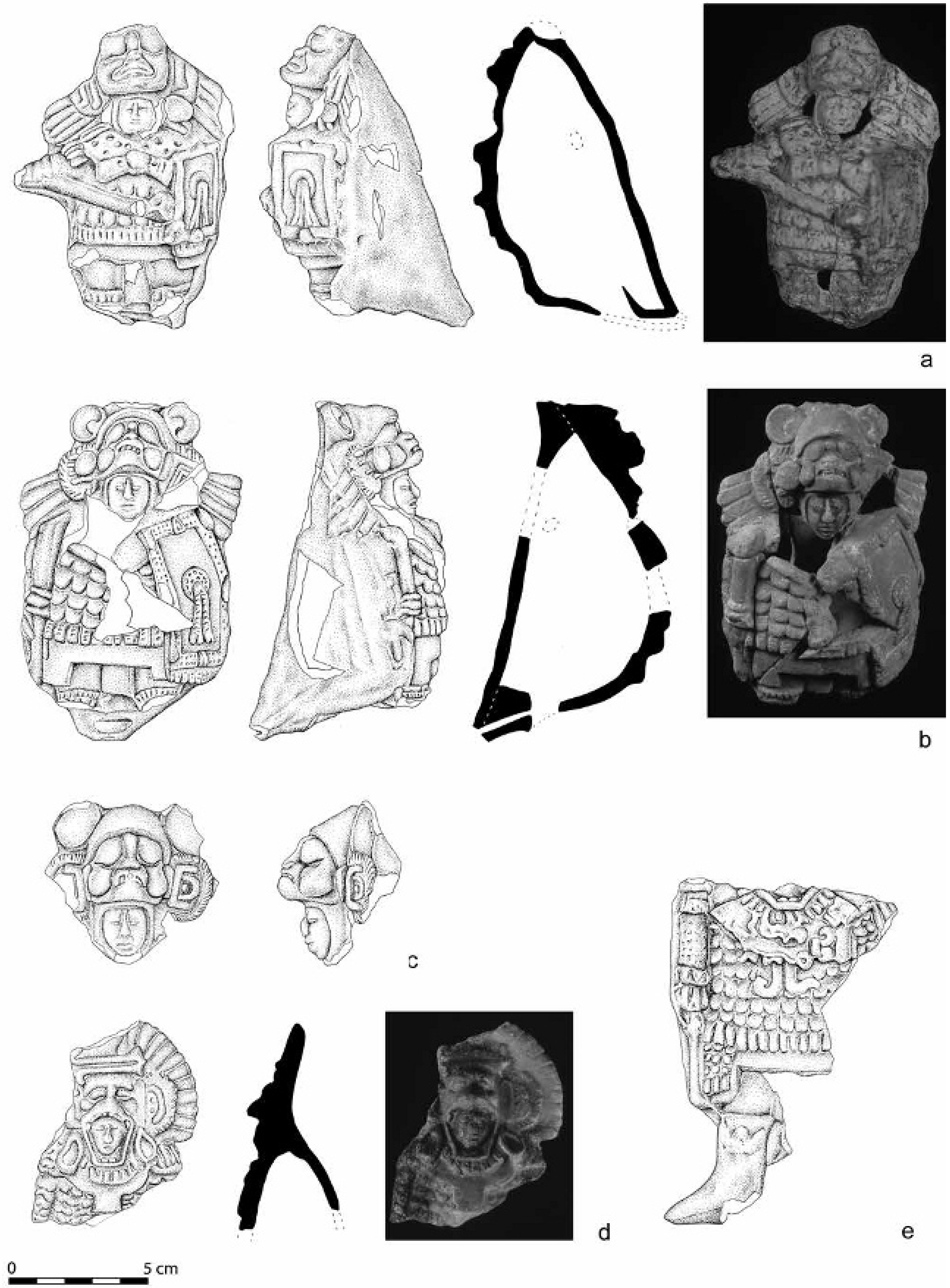


Figure 2.4. Whistles, warriors. (a) With monster headdress (23A38-3-1, Cat. 1490-1). (b) With monster headdress (22A22-2-4, Cat. 374-2). (c) Same headdress as Cat. 1409-1, but not the same mold (22B3-3-3, Cat. 179-1). (d) With war serpent headdress, has paint remnants of black, gray, red, and pink (22A14-2-4, Cat. 257-1). (e) Lower jaw of war serpent headdress visible, similar to (d) (22A9-2-1, Cat. 129-1).

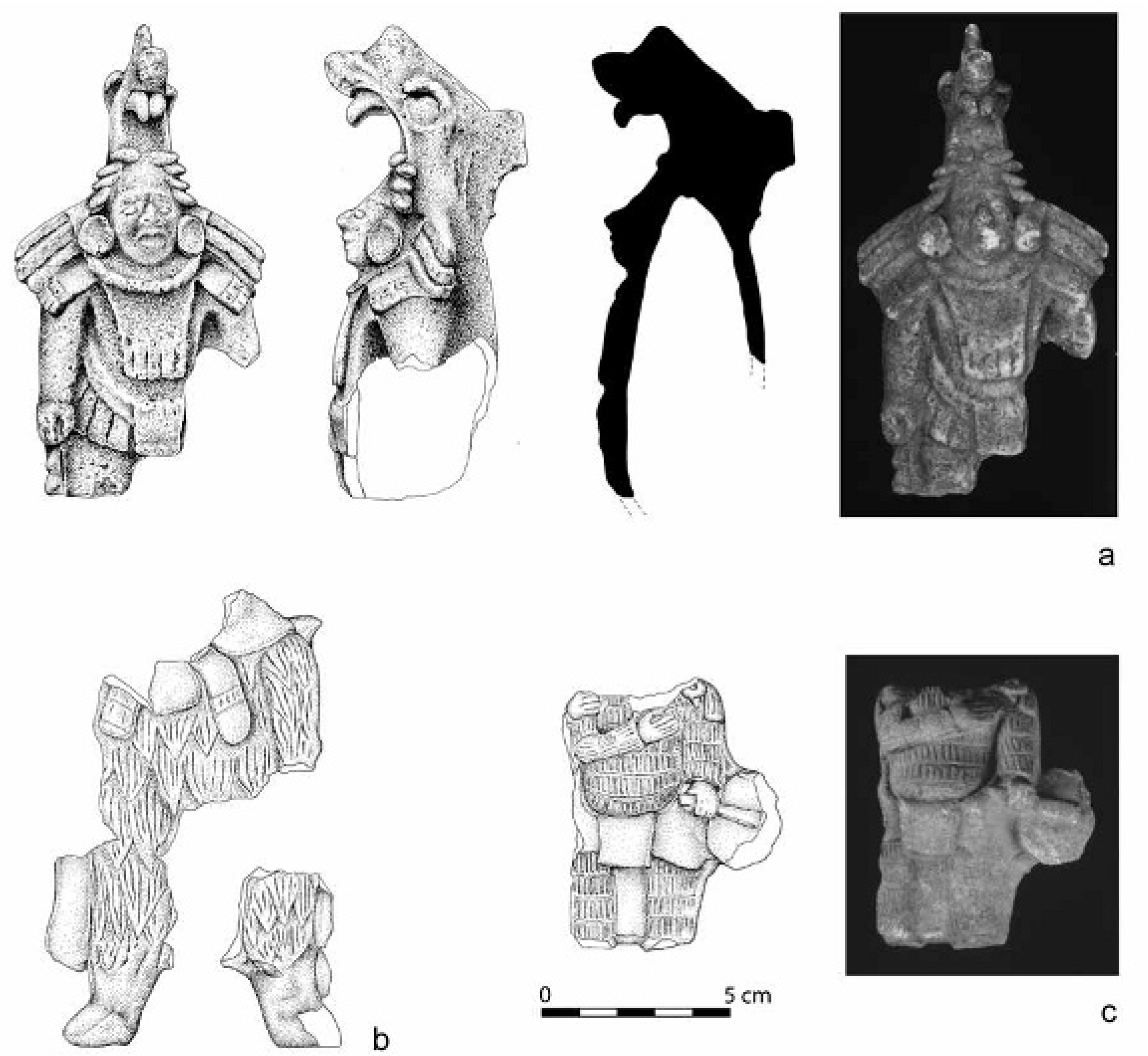


Figure 2.5. Whistles, warriors. (a) With snake headdress (20A41-3-1, Cat. 1111-1). (b) In feathered suit (22A6-3-1, Cat. 2020-1). (c) With padded suit and fan, may be fat-man impersonator (22A24-3-1, Cat. 425-1).

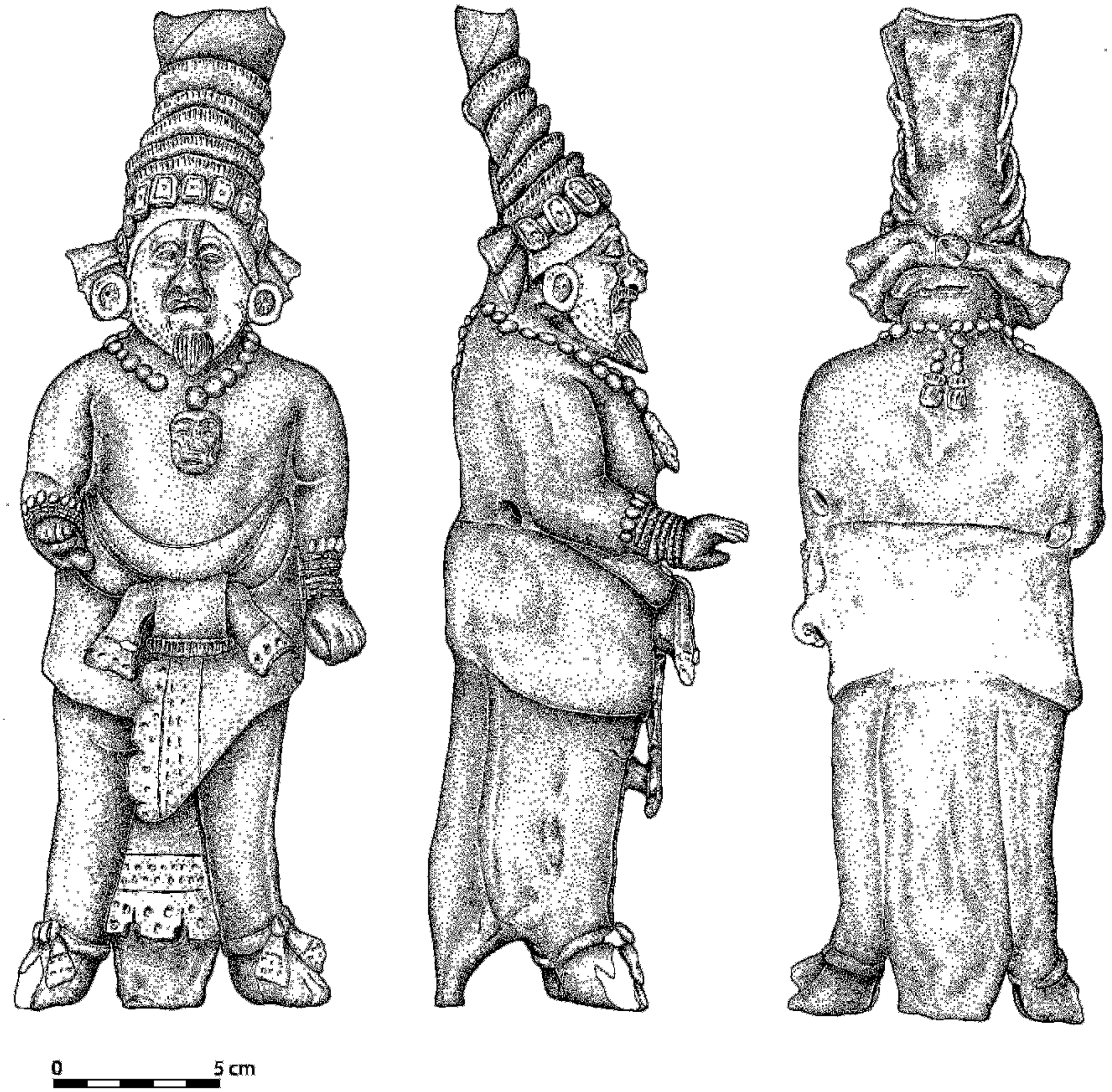


FIGURE 2.6a. Whistle, noble with feathered headdress and pectoral (23A-32-3-3, Cat. 264-1). Front, right side, and back.

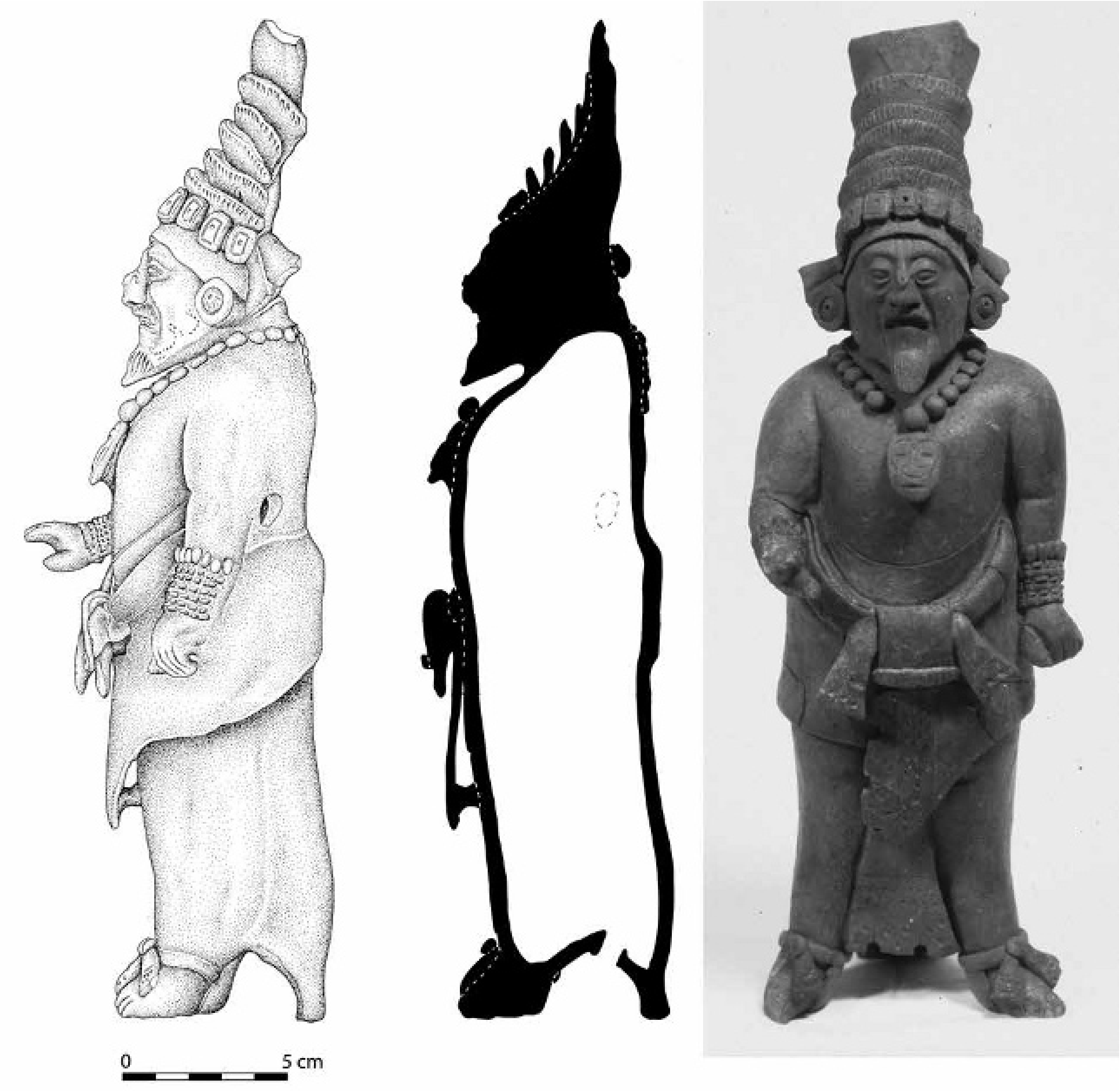


FIGURE 2.6b. Whistle, noble with feathered headdress and pectoral (23A-32-3-3, Cat. 264-1). Left side, section, and front photo.

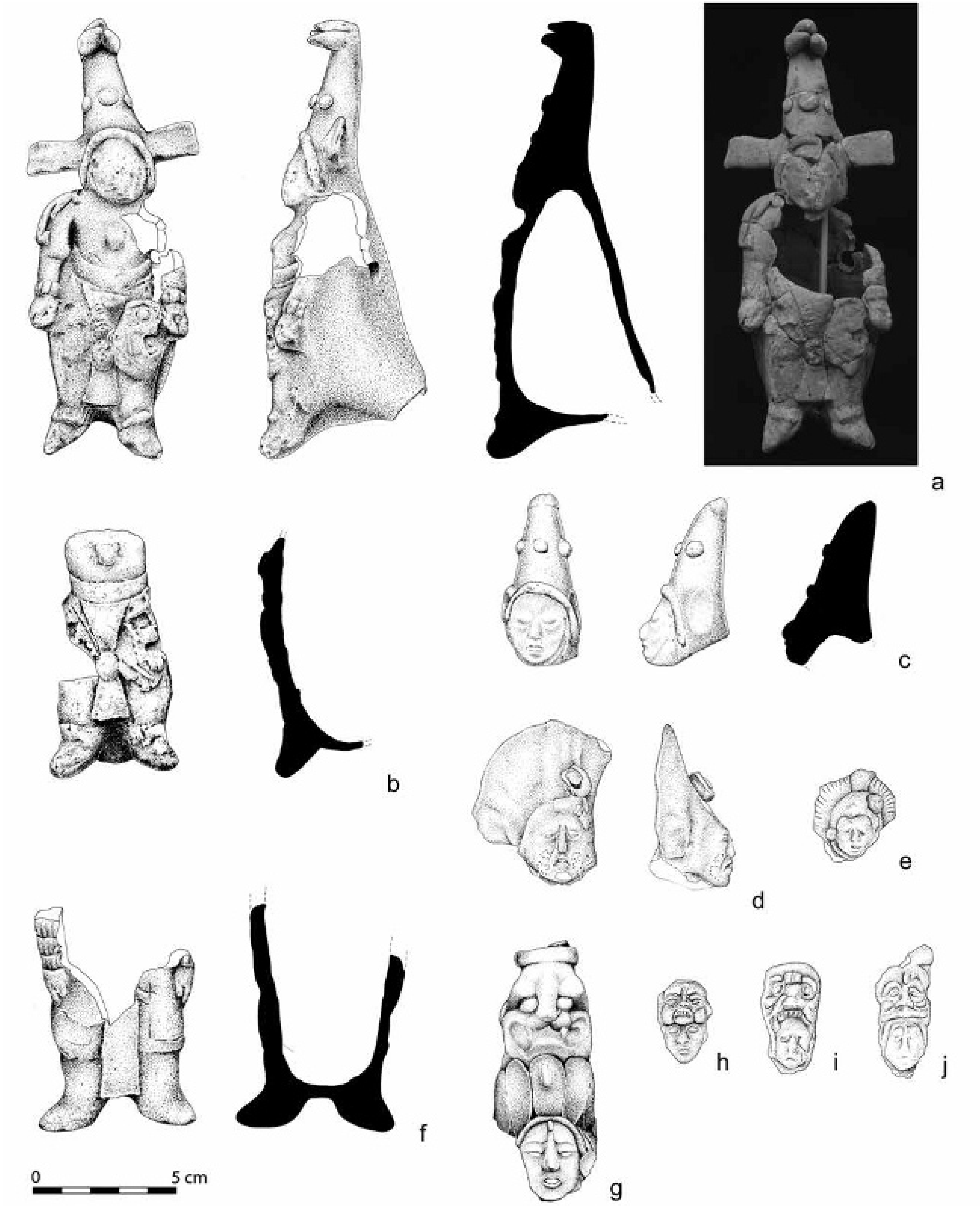


Figure 2.7. Whistles, males with elaborate attire. (a) 14B22-2-1, Cat. 739-1. (b) 14B13-1-3, Cat. 157-2. (c) 14B24-2-1, Cat. 688-1. (f) 14B24-3-2, Cat. 844-1. (a), (b), and (c) are made from the same mold. Probable whistles. (d) 14B13-1-3, Cat. 157-6. (e) 21A2-3-2, Cat. 335-1. (g) 20A4-3-2, Cat. 486-1. (h) 22A9-1-1, Cat. 123-1. (i) 23B12-3-3, Cat. 720-1. (j) 23B2-3-3, Cat. 449-2.

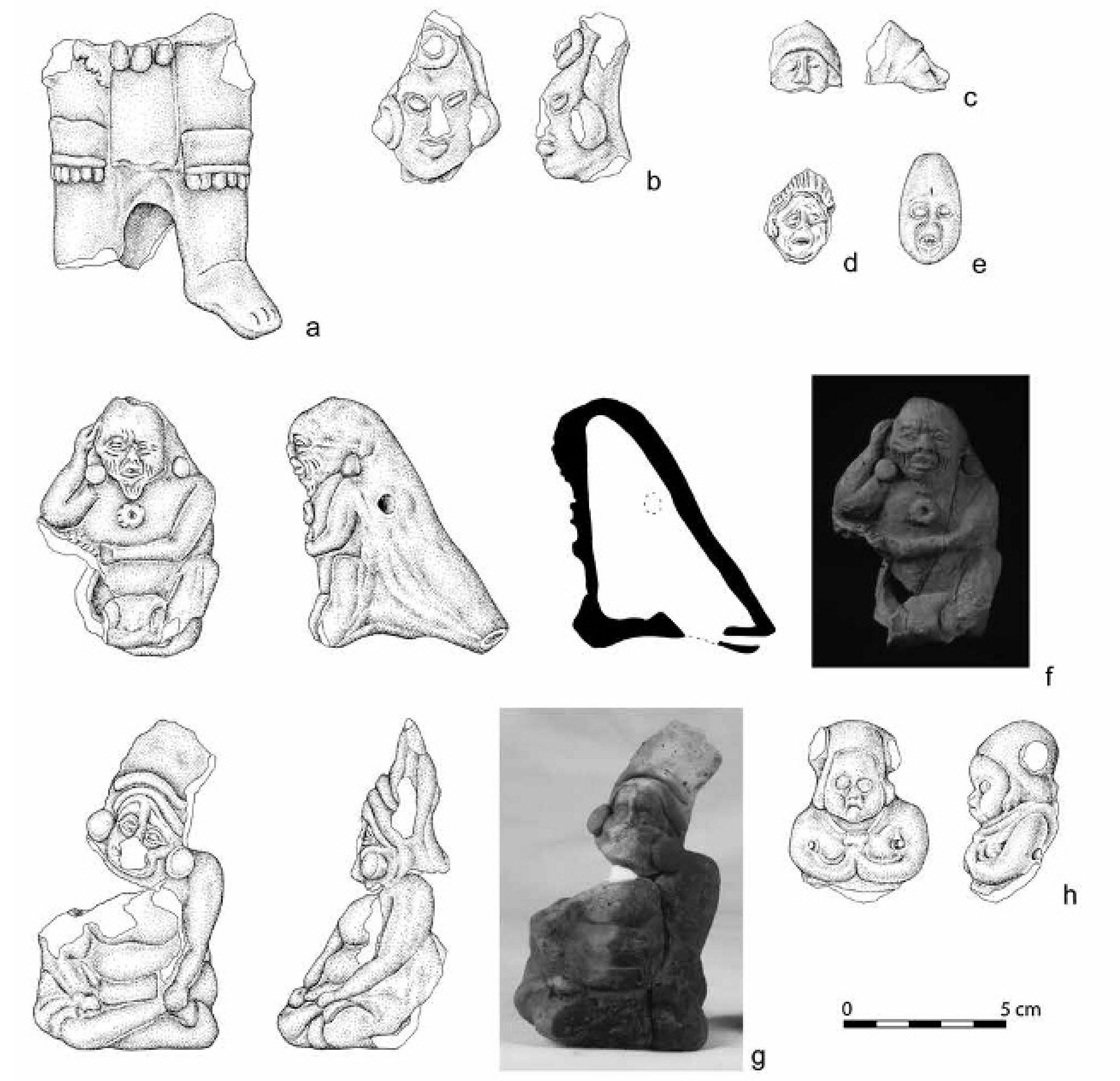


FIGURE 2.8. Whistles, males with simple attire. (a) 21A10-2-2, Cat. 491-1. Probable whistles, unclear males. (b) 24A-18-1-1, Cat. 223-1. (c) 20A17-3-1, Cat. 768-1. (d) 22A9-2-2, Cat. 139-1. (e) 23B16-2-2, Cat. 222-1. Whistles. (f) Old man (22A-12-3-1, Cat. 850-1). (g) With fat-man mask, may be "old god" impersonator (22A9-2-1, Cat. 129-2). (h) With fat-man mask (23B20-1-1, Cat. 180-1).

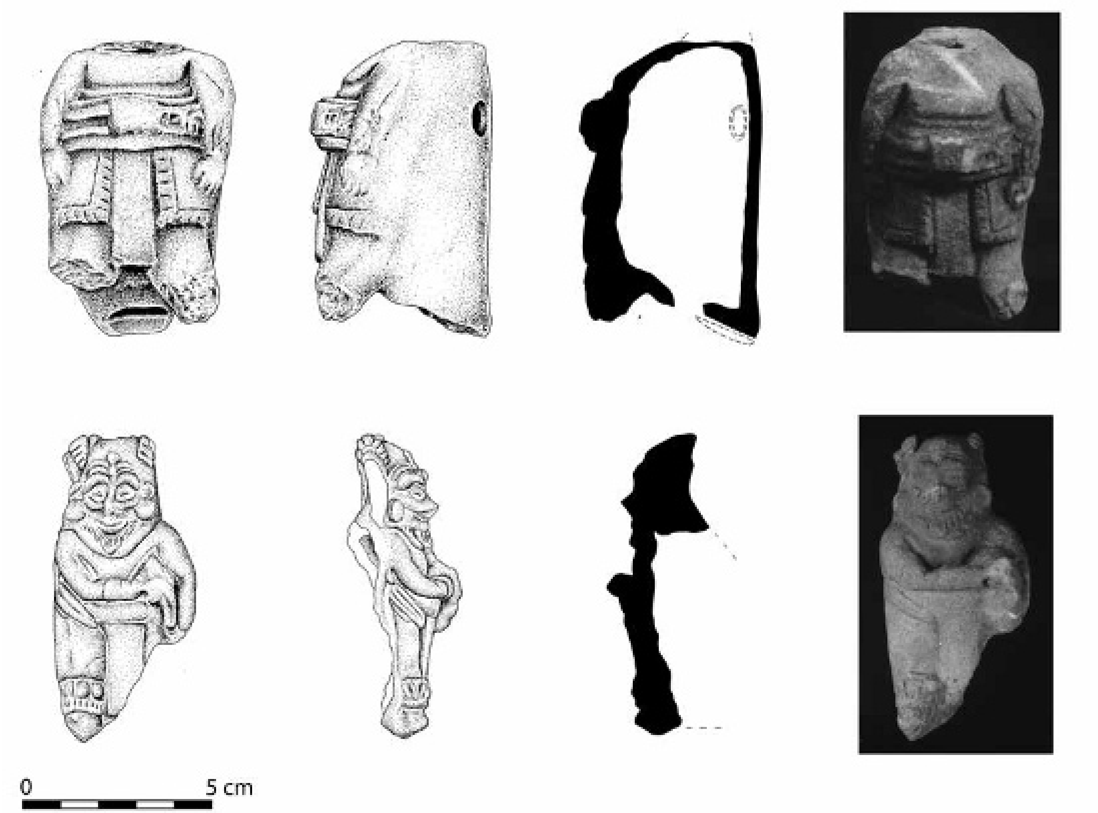


Figure 2.9. Whistles, ball players. (a) 14B13-1-1, Cat. 137-1. (b) With owl mask (21A50-3-3, Cat. 1153-1).

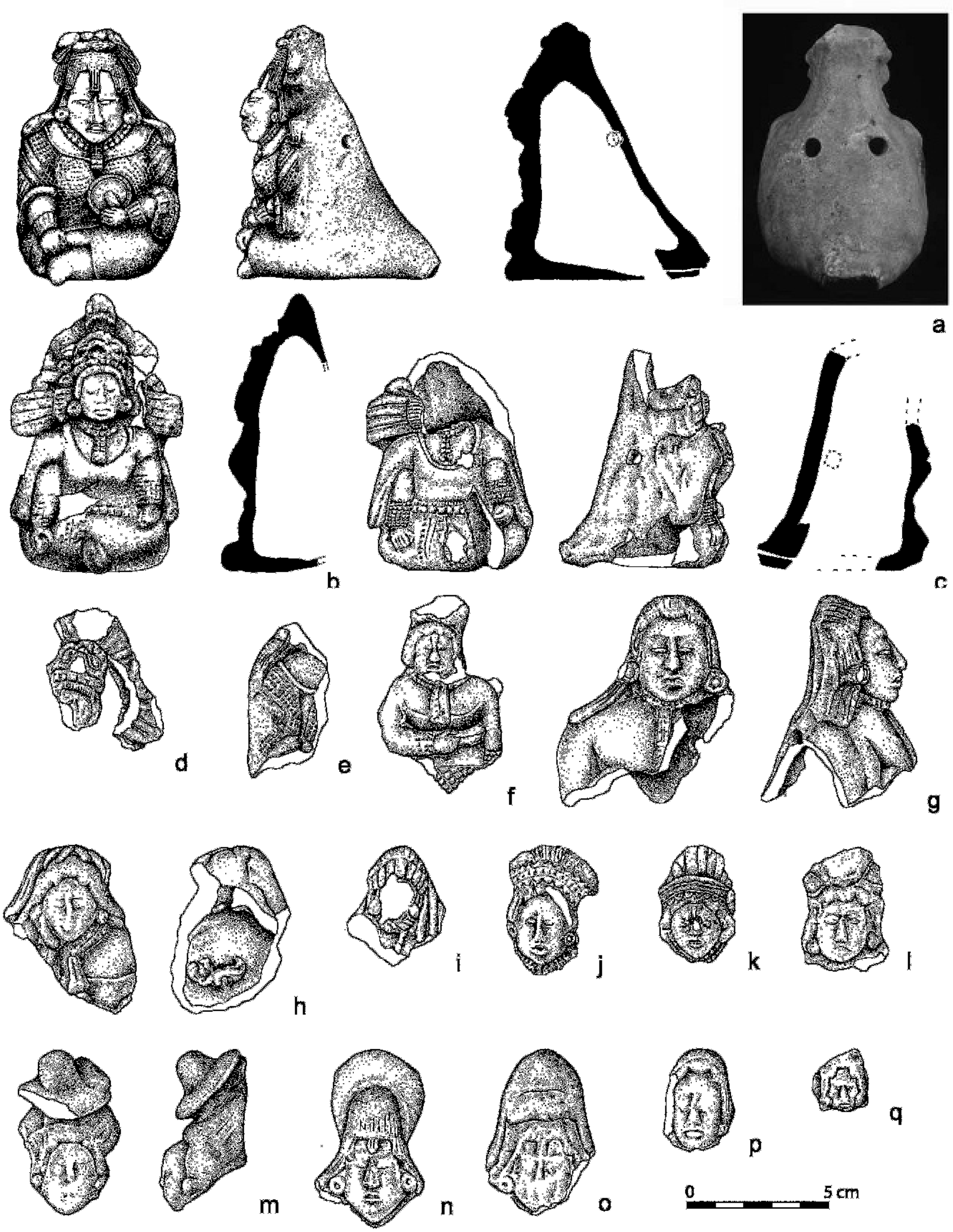


FIGURE 2.10. Whistles, females with elaborate attire and coiffure. (a) With net-woven huipil and fan, remnants of Maya Blue on skirt (20A-39-3-1, Cat. 1224-1). (b) With monster headdress (20A39-3-1, Cat. 1223-1). (c) With monster headdress (22A22-2-4, Cat. 374-1). (d) With monster headdress (21A81-3-1, Cat. 1037-1). (b), (c), and (d) are made from the same mold. (e) With net-woven huipil, similar to (d) (23A55-3-1, Cat. 2320-1). (f) 23A38-3-4, Cat. 1450-1. (g) 22B53-3-5, Cat. 658-1. (h) 14B8-2-3, Cat. 443-1; interior loop may have been used to remove the front from the mold. (i) 14B8-2-3, Cat. 443-2. (j) 23A22-3-1, Cat. 1473-1. (k) 21A55-3-4, Cat. 1384-1. (l) 23B4-3-1, Cat. 555-1. (m) with hat (14B5-1-1, Cat. 110-1). (n) 23A36-3-4, Cat. 1488-1. Females unclear. (o) 24B11-1-1, Cat. 144-1. (p) 14B11-1-1, Cat. 133-1. (q) 23B23-3-1, Cat. 716-1.

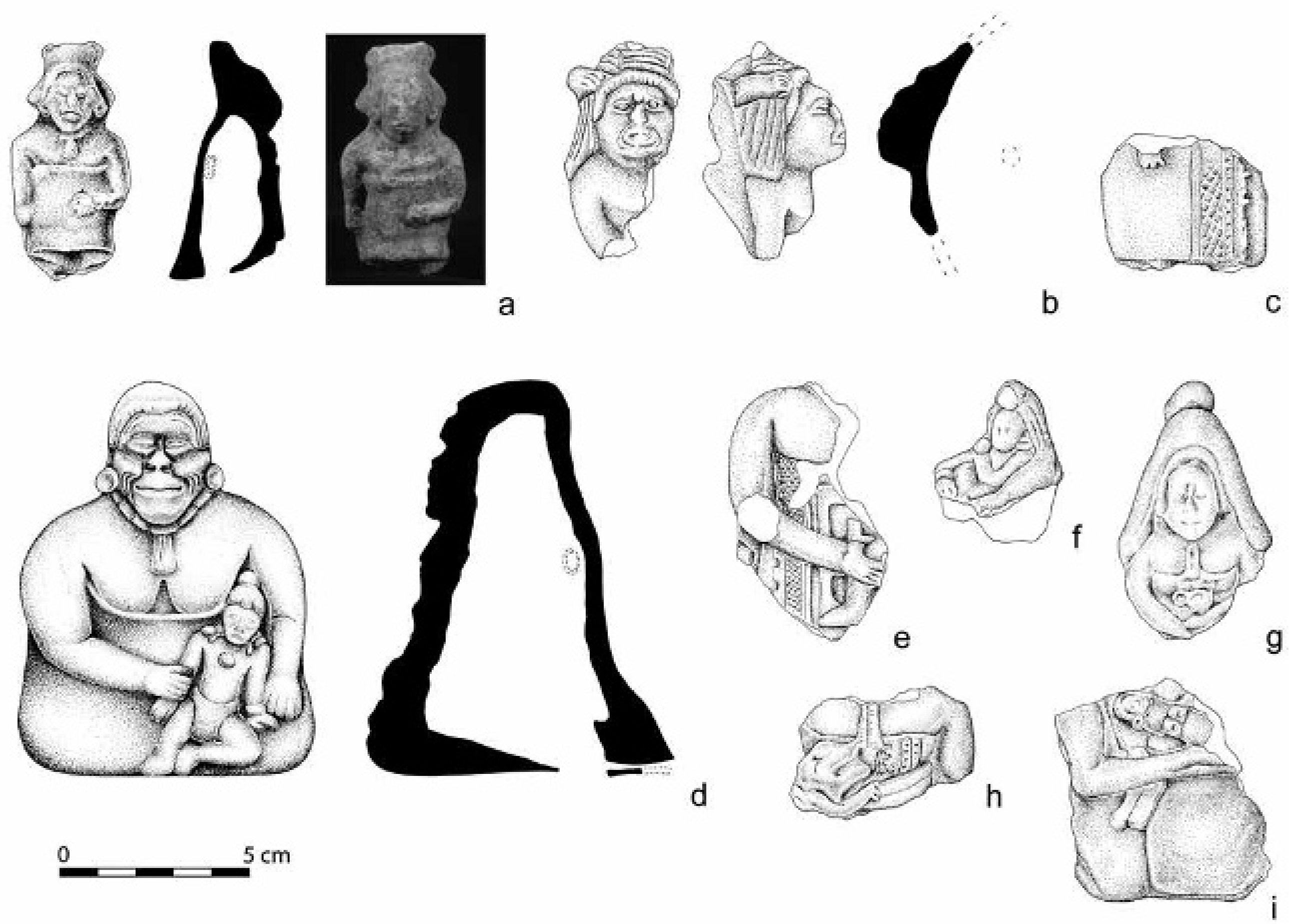


FIGURE 2.11. Whistles, females with simple attire. (a) 14B13-1-2, Cat. 148-1. (b) Holding woman by the hair or combing her (20A9-3-2, Cat. 779-1). (c) 23A36-3-1, Cat. 2323-1. Females holding child. (d) Old woman with monkey face (20A39-3-1, Cat. 1222-1). (e) 22A6-2-3, Cat. 564-1. (f) 14B13-1-1, Cat. 137-2. Female holding an animal. (g) 23A36-3-1, Cat. 1511-1. (h) 23A33-3-2, Cat. 1200-1. Female holding a doll or idol. (i) (23B12-3-1, Cat. 676-1).

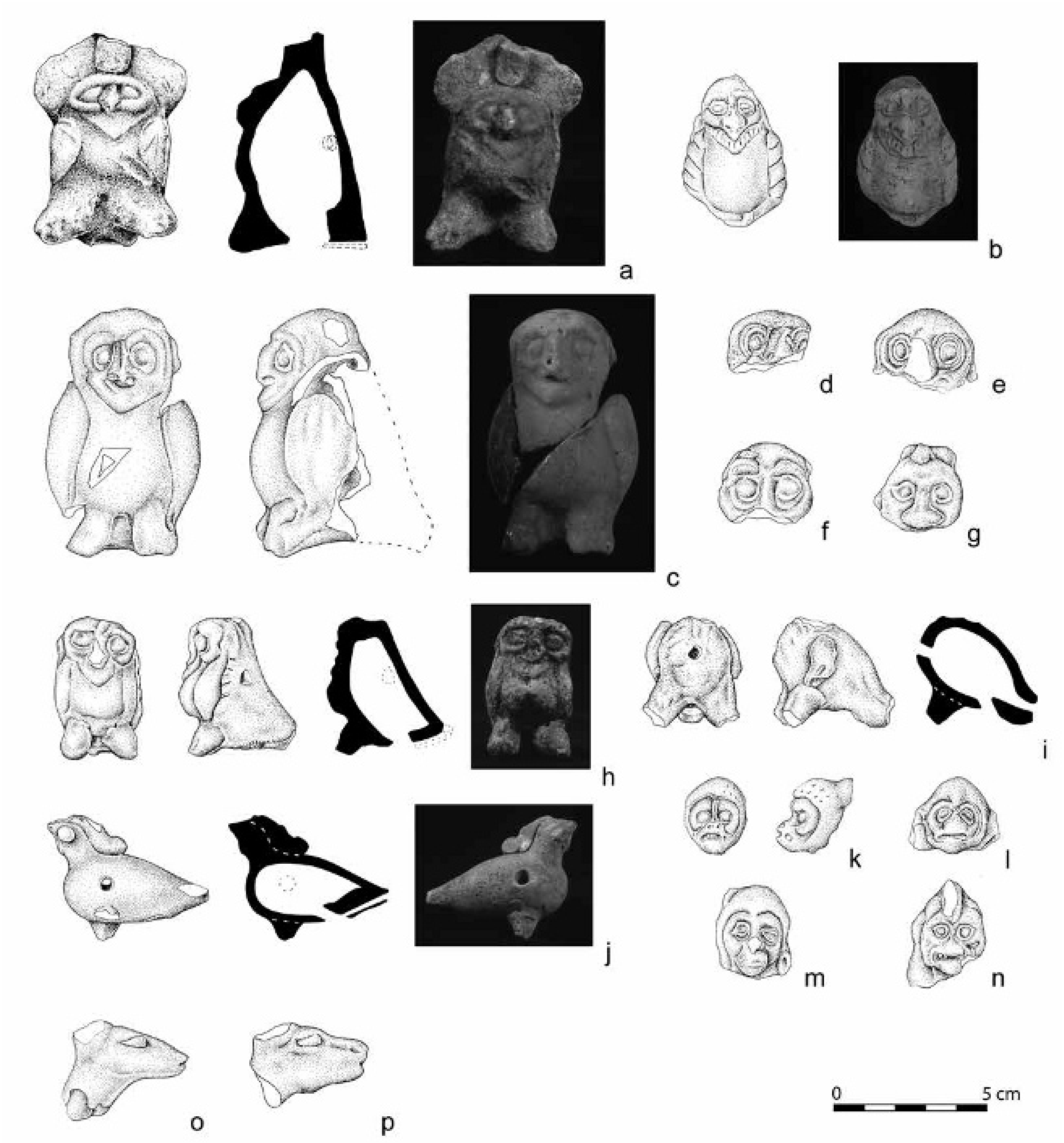


FIGURE 2.12. Whistles, animals. Owls. (a) 14B13-1-3, Cat. 157-1. (b) 23A30-3-1, Cat. 1479-1. (c) 22A6-3-1, Cat. 919-1. (d) 22B43-2-2, Cat. 373-1. (e) 22A23-2-2, Cat. 920-1. 373-1. (d) and (e) are made from the same mold. (f) 23B25-3-2, Cat. 407-1. (g) 23B18-3-2, Cat. 535-1. (h) 23A-38-3-4, Cat. 1462-1. Other birds. (i) 24A6-2-1, Cat. 193-1. (j) 22A-23-2-4, Cat. 287-1. Monkeys. (k) 20A17-3-3, Cat. 715-1. (l) 22B42-1-1, Cat. 345-1. (m) 23B2-3-3, Cat. 449-1. (n) 23B8-2-1, Cat. 207-1. Deer. (o) 23B19-3-2, Cat. 495-1. (p) 14B18-2-1, Cat. 341-1.

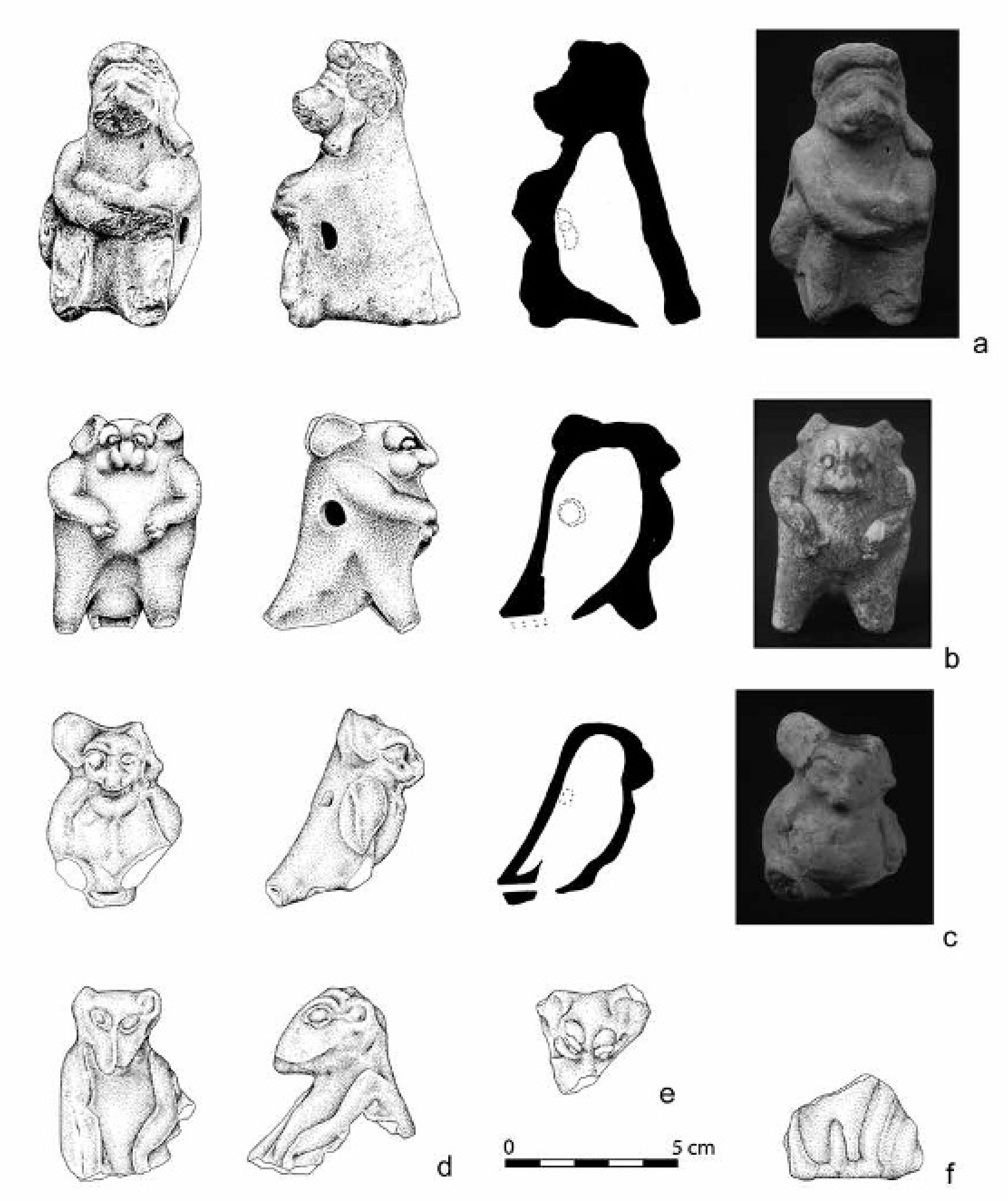


Figure 2.13. Whistles, animals. Dog. (a) with headdress (20A17-3-1, Cat. 900-1). Rodents. (b) 20A16-3-2, Cat. 714-1. (c) With Maya Blue on head (22A12-3-1, Cat. 849-1). (d) 23B6-3-3, Cat. 469-1. (e) 14B8-2-3, Cat. 443-3. (f) Unidentified male animal 22A28-2-2, Cat. 716-1.

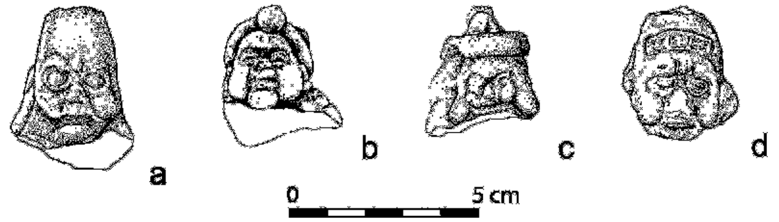


Figure 2.14. Whistles, supernaturals and grotesques. (a) Deity, unclear (14B11-2-1, Cat. 312-1). Fat man. (b) 14B13-1-2, Cat. 148-2. (c) 14B13-1-2, Cat. 148-3. (d) 23B20-3-3, Cat. 507-1.

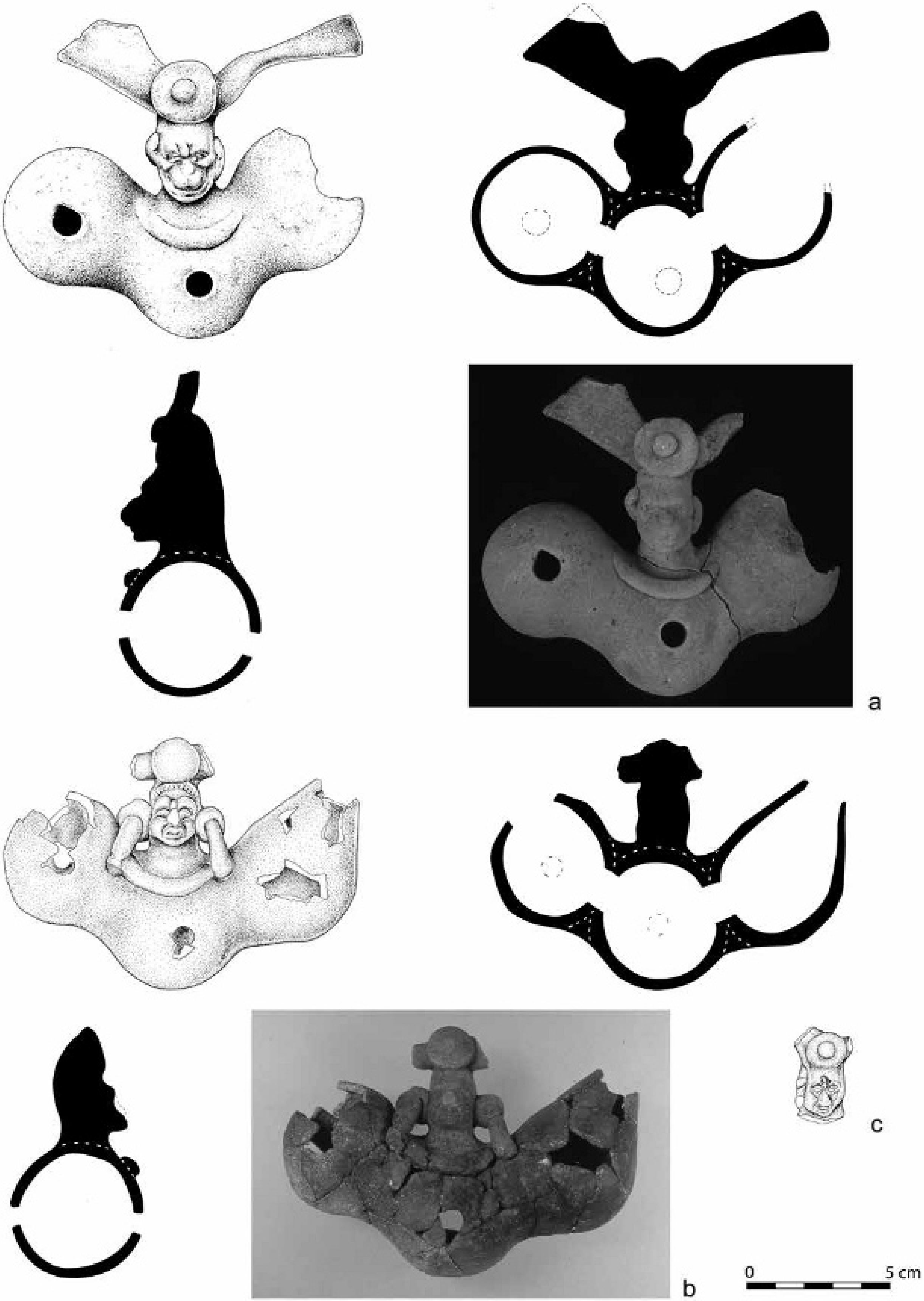


Figure 2.15. Whistles with multiple resonators. Monkey. (a) With headdress, remnants of Maya Blue on headdress (14B25-2-1, Cat. 759-1). (b) With headdress and ear spools (23A44-3-1, Cat. 1305-1. (c) 22B35-3-4, Cat. 446-1, similar to (a).

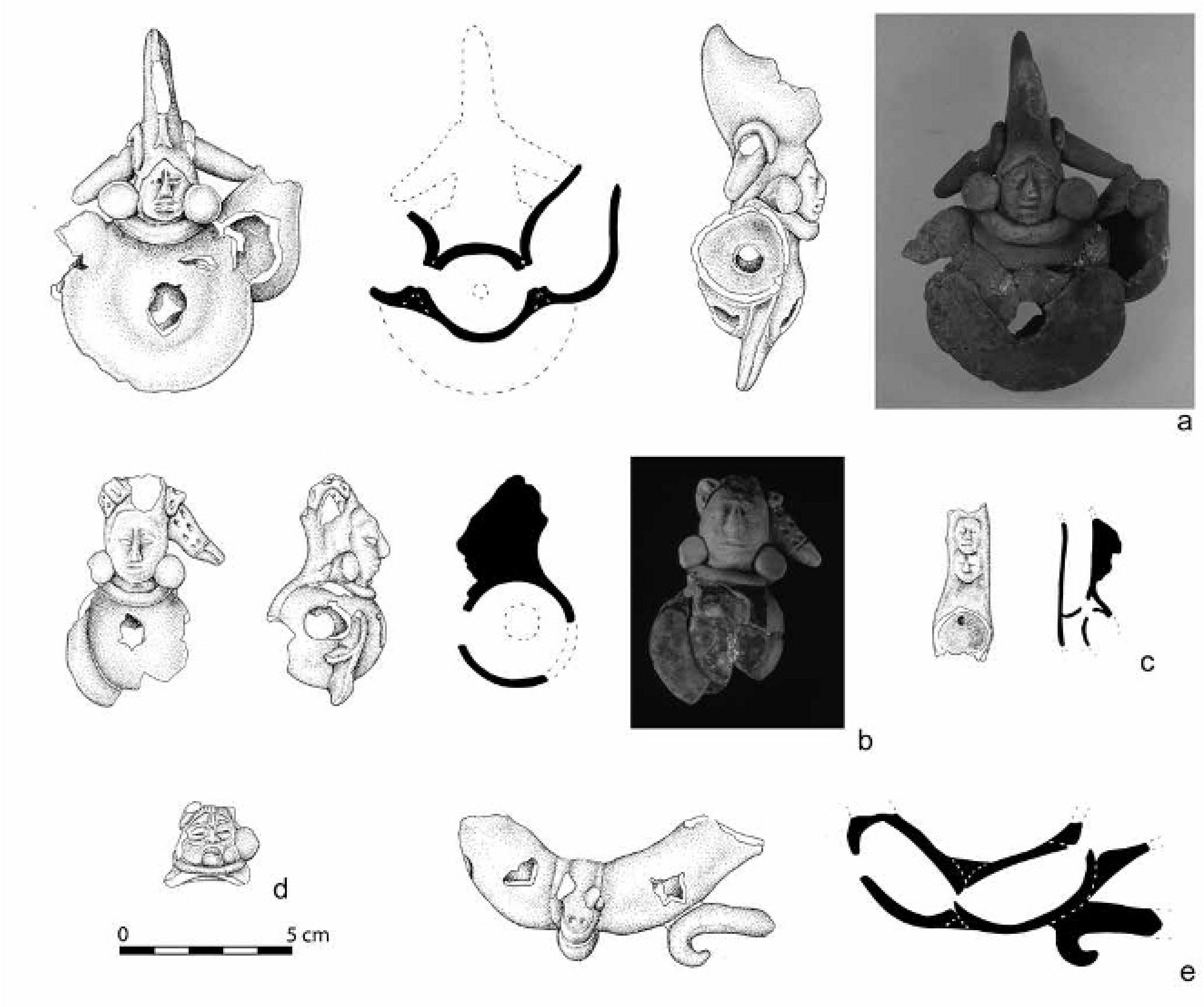


Figure 2.16. Whistles with multiple resonators. (a) Male with large headdress (23A44-3-1, Cat. 955-1). (b) Male with headdress, remnants of black paint on front (22A6-3-1, Cat. 2020-6). (c) 23B-5-3-4, Cat. 392-3. (d) Fat man (23A55-2-1, Cat. 2324-1). (e) 22B-51-2-3 Cat. 484-1; parts were found in 23A43-3-5.

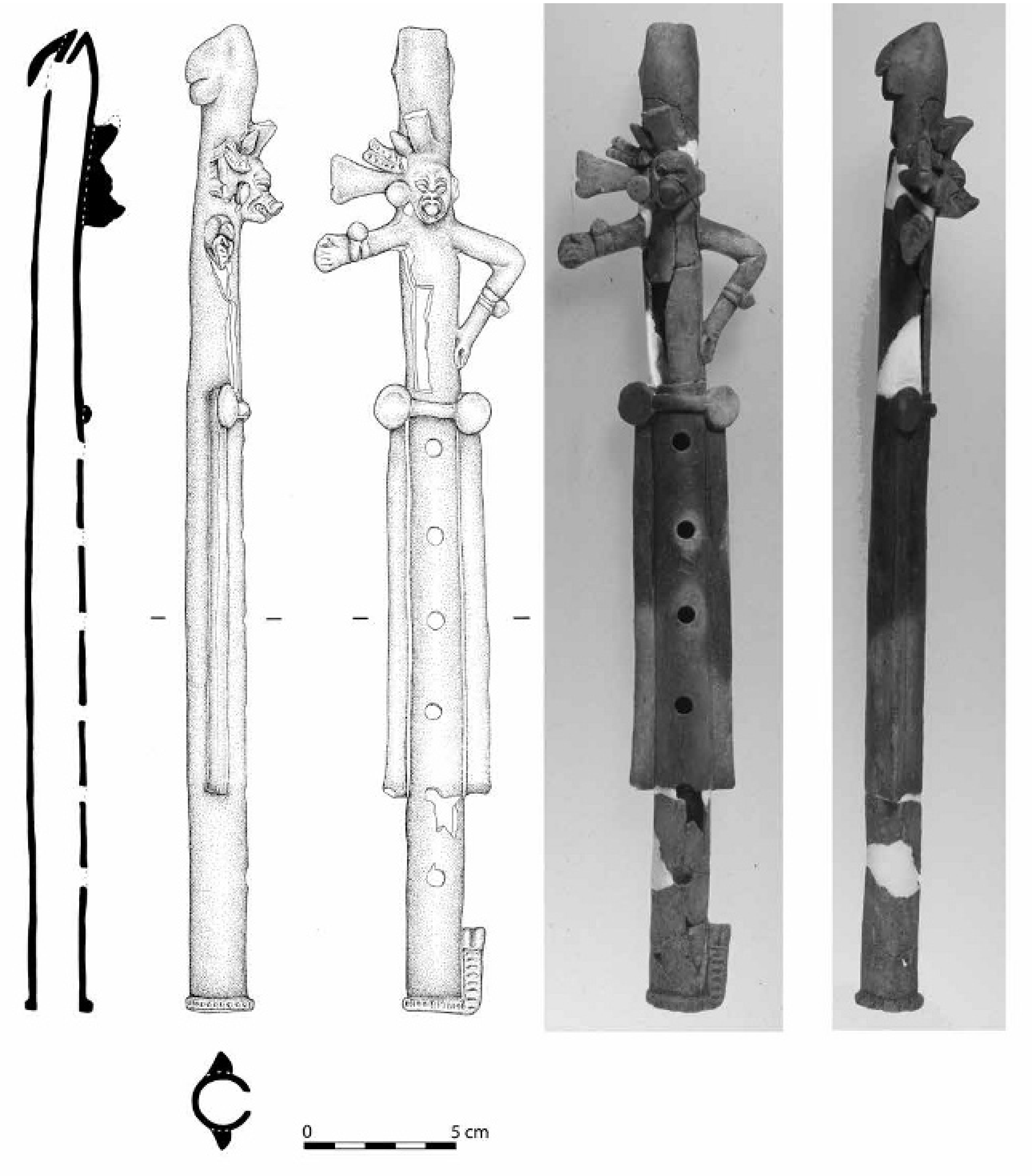


FIGURE 2.17. Flute with pizote (coatimundi) appliqué, 23A43-3-5, Cat. 1604-1.

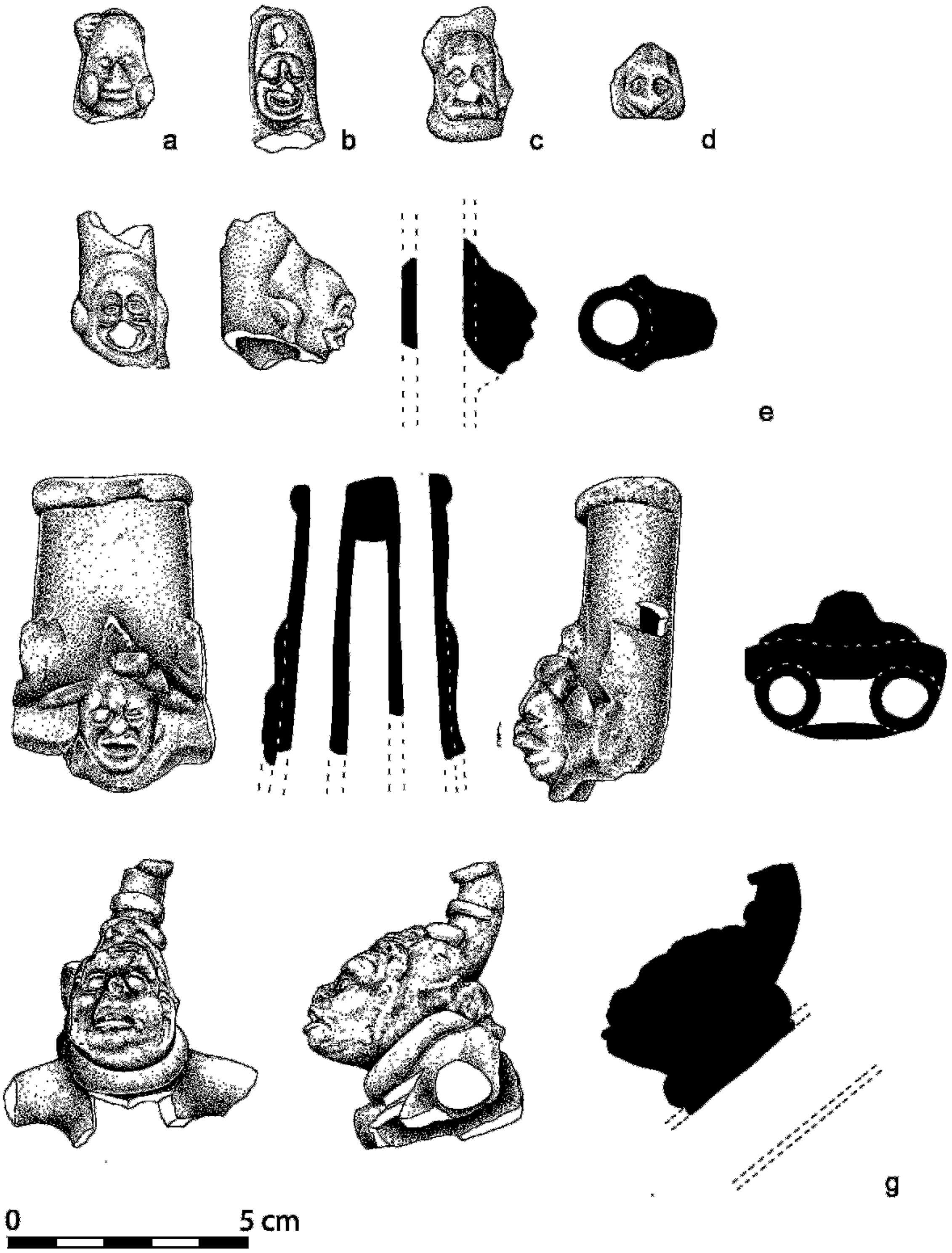


Figure 2.18. Flutes. (¾ scale) (a) Fat man (23A22-3-2, Cat. 1472-1). (b) Anthropomorph (23A30-2-2, Cat. 1313-1). (c) Monkey (23A36-3-4, Cat. 1798-1). (d) Bird (23A24-3-4, Cat. 2328-1). (e) Deity? (20A32-3-4, Cat. 1506-1). (f) Double flute, grotesque face (20A3-3-5, Cat. 338-1). (g) Male with jelly bag cap (20A17-3-4, Cat. 718-1).

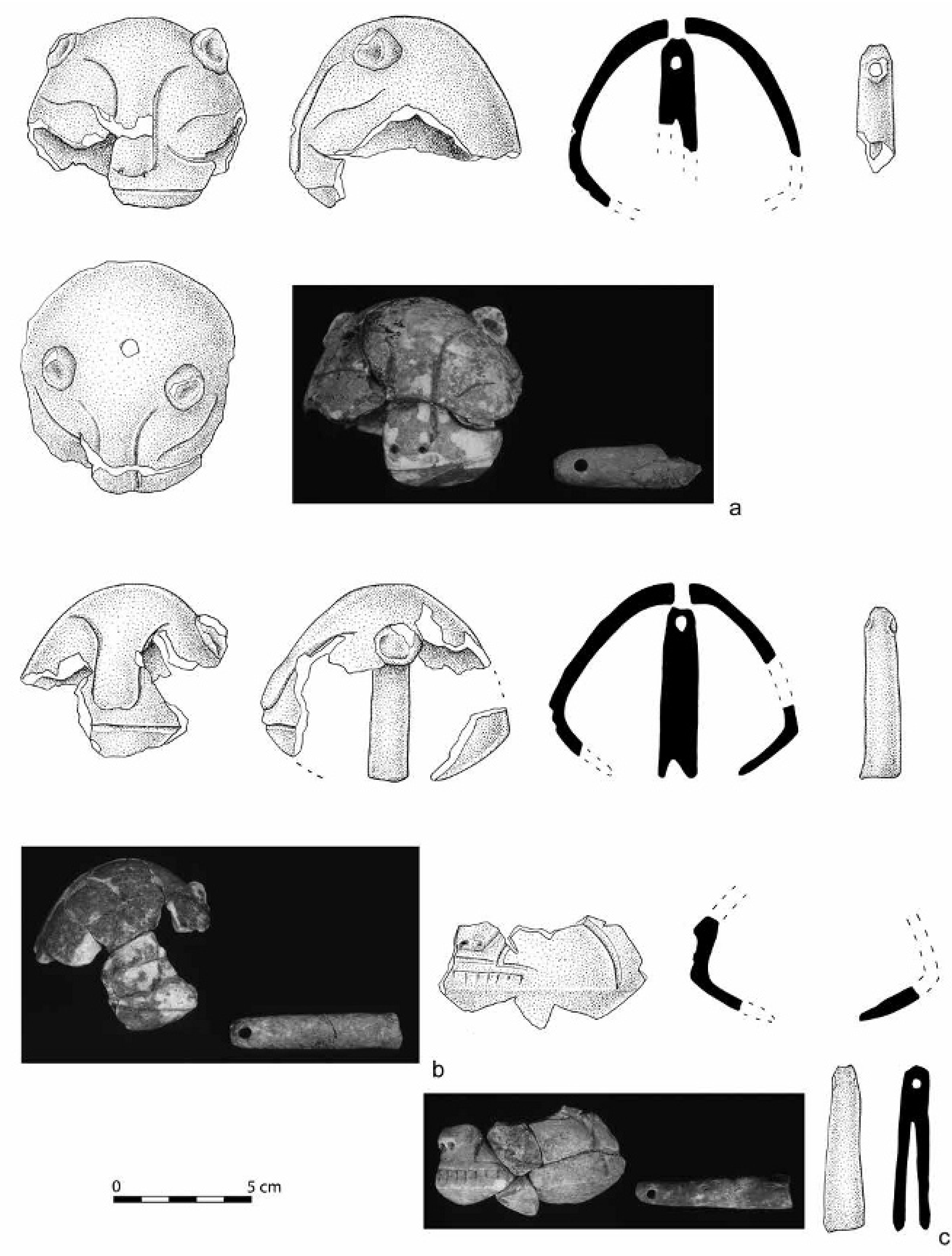


Figure 2.19. Ceramic bells, Chablekal Gray ware, felines. (a) Bell 23A20-3-1, Cat. 1244-1; clapper 23A20-3-1, Cat. 1244-2. (b) Bell 23A45-3-1, Cat. 960-1; clapper 23A32-1-1, Cat. 226-1. (c) Bell 23A32-3-1, Cat. 1482-1; clapper 23A32-3-2, Cat. 1030-1.

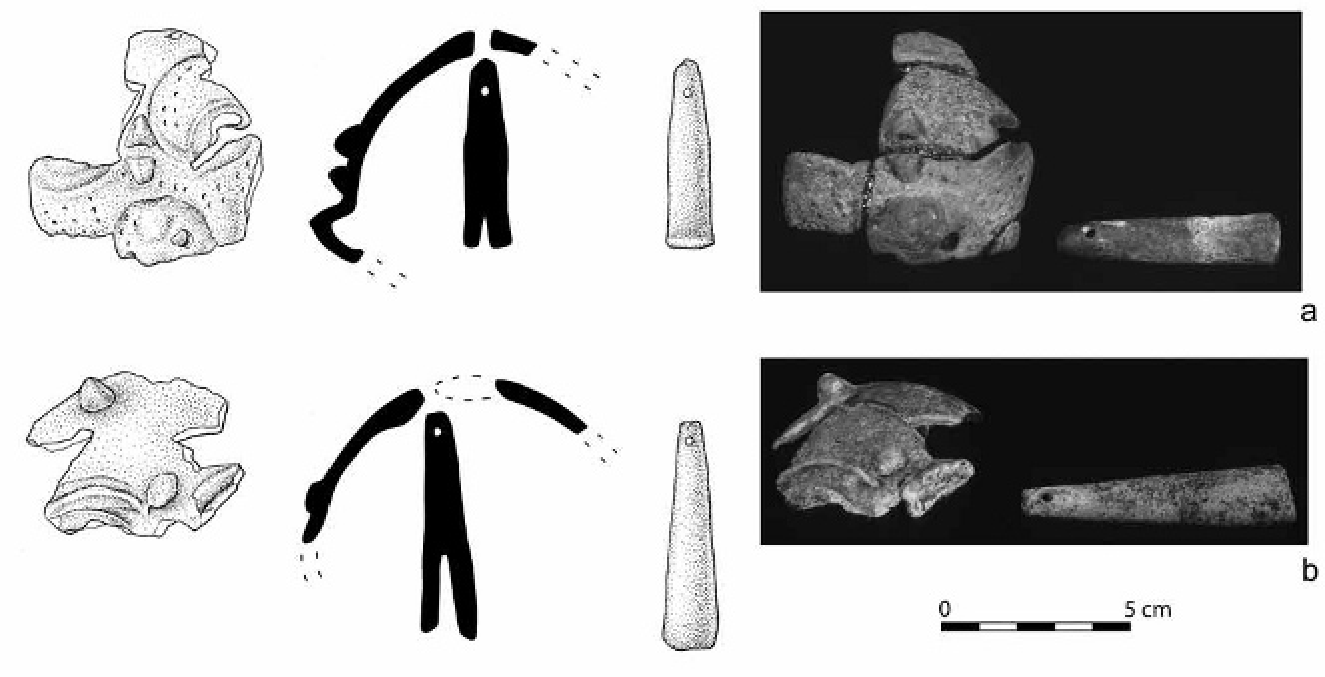


Figure 2.20. Ceramic bells, Chablekal Gray ware, unidentified zoomorphic. (a) Bell 23A50-1-1, Cat. 255-1; clapper 23A16-3-2, Cat. 1188-1. (b) Bell 23A50-1-1, Cat. 255-2; clapper 23A25-3-2, Cat. 364-1.

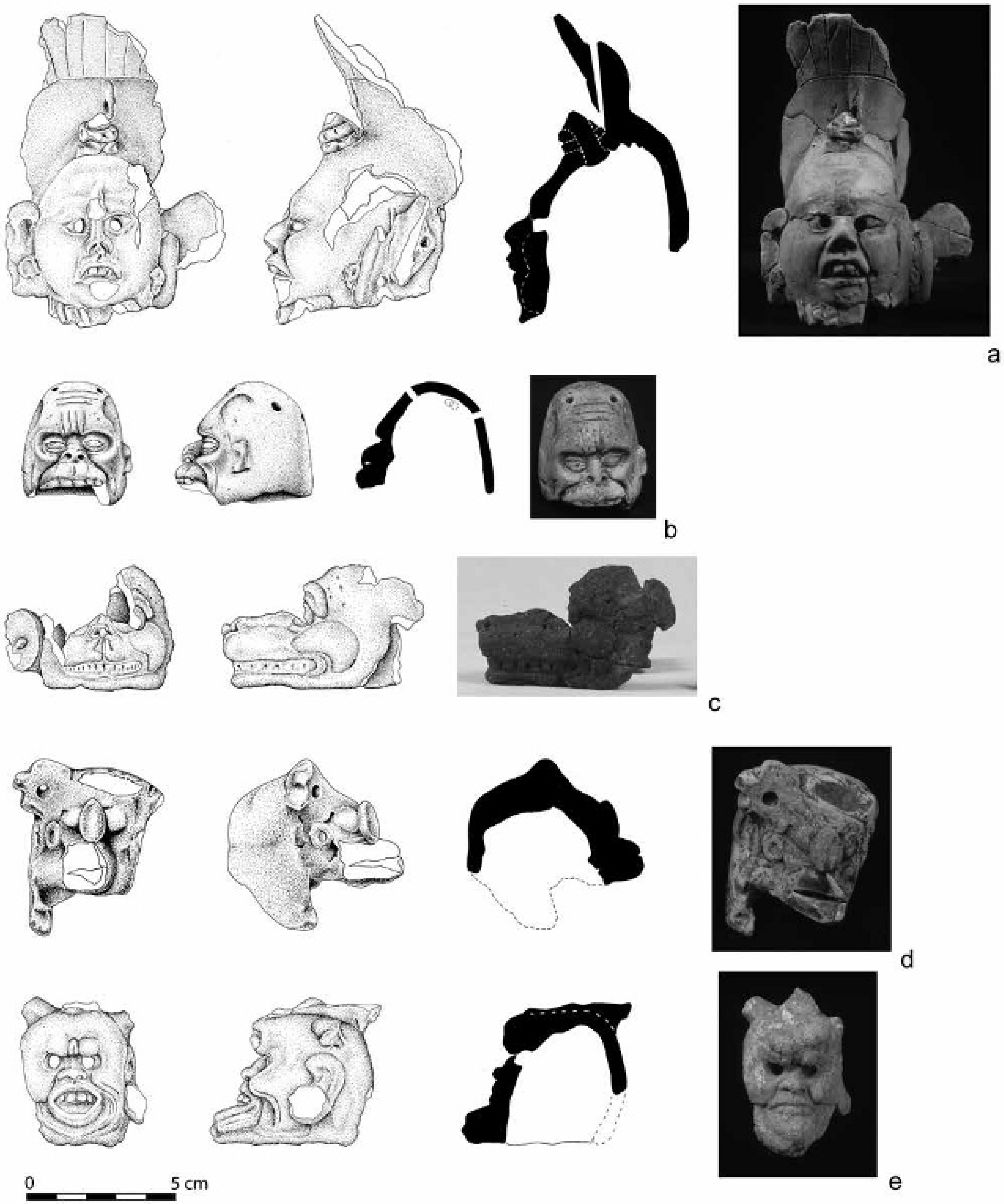


FIGURE 2.21. Hollow-heads. (a) Male with large headdress (23A42-3-2, Cat. 1981-1). (b) Monkey (14B26-2-1, Cat. 762-1). (c) Dog, heavily burned (23A44-3-1, Cat. 1615-1). (d) Bat (14B19-3-3, Cat. 899-1). (e) Grotesque (22B51-3-2, Cat. 640-1).

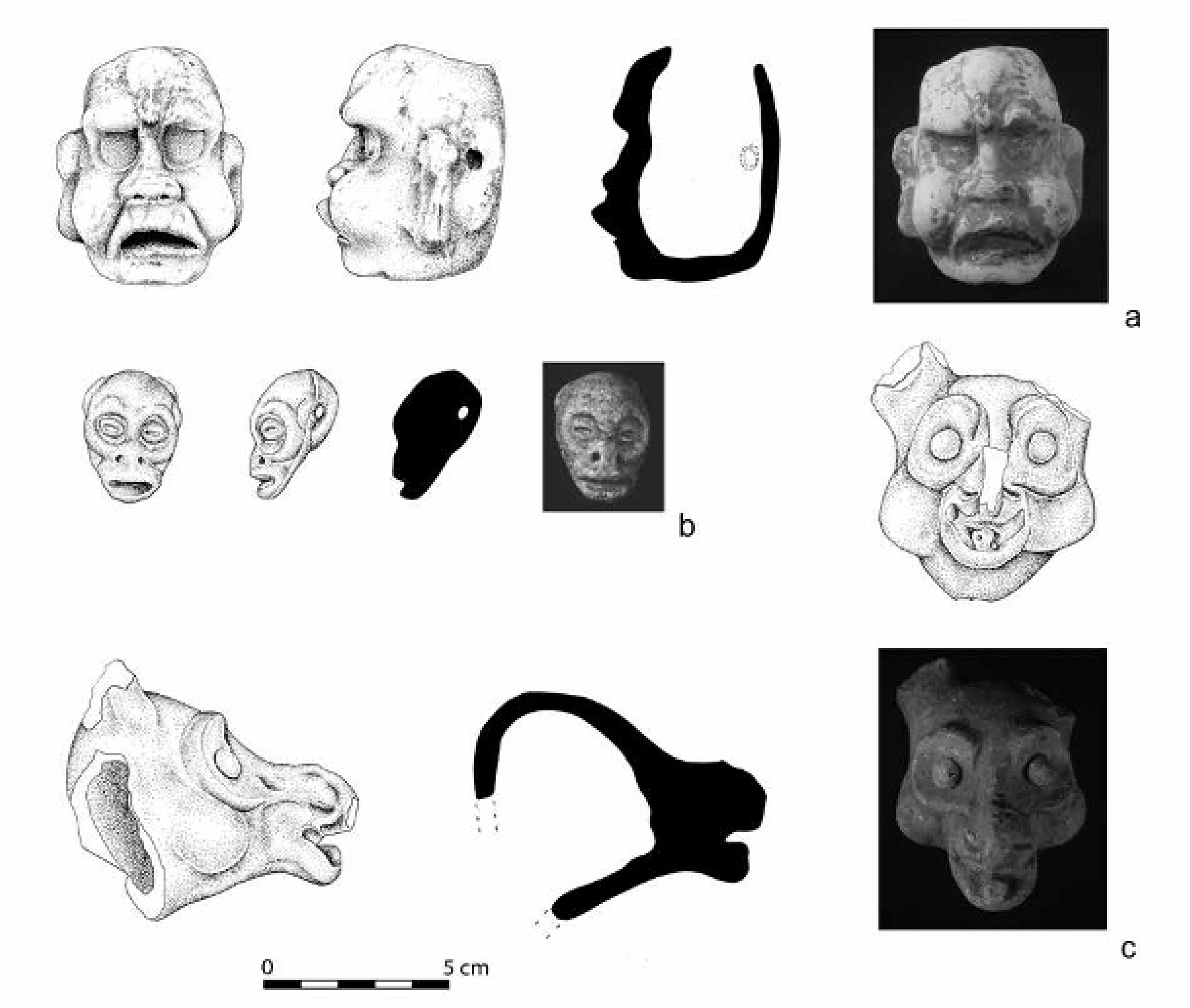


FIGURE 2.22. (a) Vessel-shaped figurine, grotesque head (20A6-3-3, Cat. 775-1). (b) Pendant, monkey (23B2-3-4, Cat. 453-1). (c) Zoomorphic, unclear, indeterminate function (21A68-3-3, Cat. 1133-1).

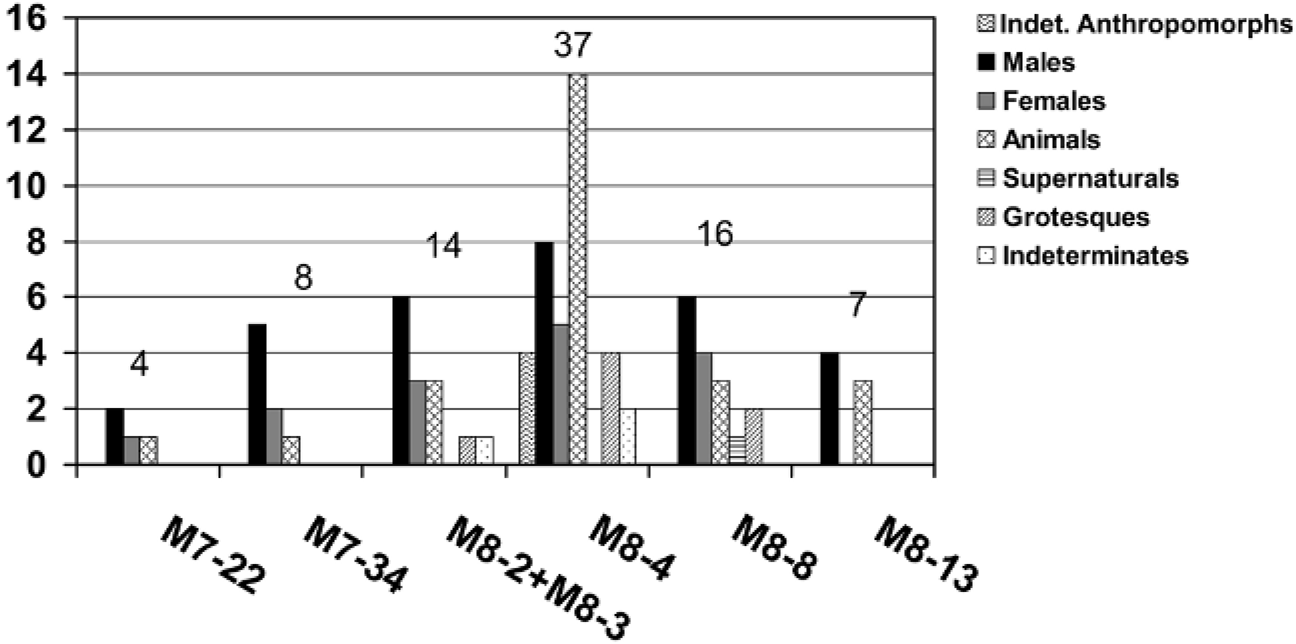


Figure 2.23. Figurine assemblages found in situ in excavated structures, showing different motifs. Figurines were probably complete at abandonment; n = 86.

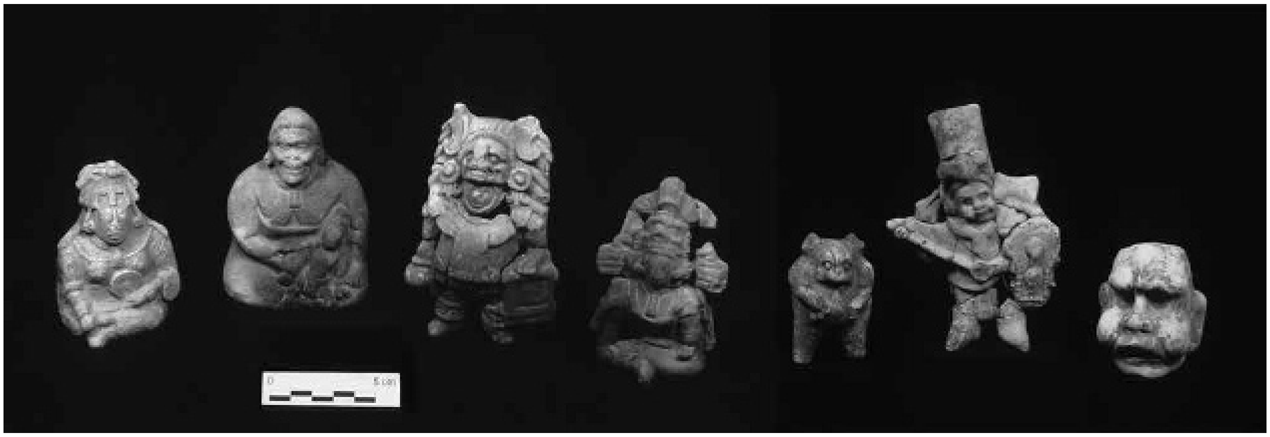


Figure 2.24. Part of the figurine assemblage from Structure M8-8. From left to right: 20A39-3-1, Cat. 1224-1; 20A39-3-1, Cat. 1222-1; 20A22-3-1, Cat. 1209-1; 20A39-3-1, Cat. 1223-1; 20A16-3-2, Cat. 714-1; 20A17-2-3, Cat. 818-1; 20A6-3-3, Cat. 775-1. Not to standardized scale.

chapter

3

Worked Sherds and Other Ceramic Artifacts

Takeshi Inomata

Worked sherds include objects that were reshaped for functions different from the original ones. All the excavated examples were made from fragments of ceramic vessels. Other ceramic artifacts include artifacts originally shaped into forms other than vessels, figurines, musical instruments, or spindle whorls. This chapter also includes unfired clay. The stick-shaped objects with a hole in one end excavated from Structure M8-4 (Operation 23A) may have served as bell clappers, and they are described with figurines in Chapter 2. Worked sherds or ceramic artifacts that appear to be mirror backs are described with pyrite mirrors in Chapter 6.

Worked Sherds

There are four types of worked sherds: (1) medium-sized round sherds with smoothed edges, (2) notched sherds, (3) other sherds with smoothed edges, and (4) sherds with rough edges.

Medium-Sized Round Worked Sherds with Smoothed Edges

The round worked sherds measure 2 to 7 cm in diameter, and most of them appear to have had a hole in the center (Table 3.1; Figures 3.1, 3.2). Only Cat. 23B761-1 clearly did not have a hole. It is not clear whether this was the intended product or whether it was discarded before perforated. These artifacts are often interpreted as spindle whorls, and some of the objects from Aguateca may have served that function. Nonetheless, Moholy-Nagy (2003a:76) notes that ethnographic examples of sherd disks used as spindle whorls are rare. We should note that many of the perforated sherds found at Aguateca and other sites are not well rounded or their holes are not well centered. These pieces possibly had functions other than spinning tools. The number of round worked sherds is small (*n* = 11) compared with spindle whorls of hemispherical or similar forms (*n* = 61) (see Chapter 4). Many of the round worked sherds were found in or around Structures M8-13, M8-2, and M8-3. If they were used as spindle whorls, their high frequencies in these buildings may be related to the lower status of their occupants. The higher-status residents of other buildings may have preferred spindle whorls made of stone. If they were not used as spindle whorls, they may be related to unique activities conducted in and around Structures M8-13, M8-2, and M8-3.

Worked Sherds with Notched Ends

Notched worked sherds are sherds worked into rectangular or oval shapes with two notches (Table 3.2, Figure 3.3). Four examples found were made from Subin Red bowls, and notches were made between the thickened rims and the ridges. One was made of a plain body sherd without ridges. All of them have well-worked smooth edges. It appears that cords were tied to these notches. Three examples are from Structure M8-2 (Operation 23B), and two are from wall-fall layers of Structure M7-32 (Operation 22B). During the Petexbatun Project, two notched sherds were found associated with Structure M8-10 (north addition and the midden to the south), and one from a Late Preclassic fill of Platform L6-2. The artifacts may be related to unique activities conducted by the residents or users of Structures M8-2 and M8-10. Their possible function as fish-line or fishnet weights has been suggested (Sanders 1960; Willey 1972:81–82; Willey et al. 1965:405). It is also probable that they were string-saw anchors or handles for other types of string tools. At Cancuen, Kovacevich (2006:Figures 5.15, 5.32, 6.6) has identified oval-shaped ceramic string-saw anchors in probable jade and pyrite workshops. The fact that the notched sherds from Aguateca fit well in the hand appears to support this use, but they were not found in pairs.

Table 3.1. Medium-Sized Round Worked Sherds.

Provenience	Catalog No.	Condition	Ceramic Type	Diameter (cm)	Thickness (cm)	Hole	Hole diameter (cm)	Weight (g)	Note
14B13-1-3	994-1	broken	Tinaja/Pantano	6.3	0.7	Y	0.70	16.3	
14B14-2-1	1021-1	broken	Tinaja/Pantano		0.5	?		5.5	Not very round
14B5-2-3	1022-1	broken	Tinaja/Pantano	6.4	0.6	Y		12.6	
14C5-3-1	206-1	broken	Tinaja/Pantano	6.1	0.8	?		12.2	Not very round
20A18-3-4	970-1	broken	?	5.1	1.4	Y	0.69	27.0	Not very round
20A24-3-2	1205-1	complete, burned	Andres Red	5.4	0.7	Y	0.62	21.6	
21A54-3-2	1107-1	complete	Tinaja/Pantano	2.8	0.6	Y	0.45	5.4	Hole not centered
23B24-2-1	761-1	complete	Tinaja/Pantano	4.3	0.8	N		12.5	
23B12-3-3	762-1	broken	Tinaja/Pantano	5.7	0.8	?		11.9	
23B21-3-1	810-1	broken	Tinaja/Pantano	6.1	0.7	?		16.9	
23B19-3-2	824-1	broken	?		0.6	?		4.3	

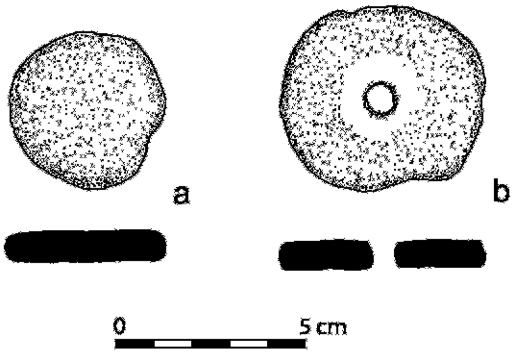


Figure 3.1. Medium-sized round worked ceramic disks. (a) Round disk without holes (23B24-2-1, Cat. 761-1). (b) Perforated round disk (20A24-3-2, Cat. 1205-1).

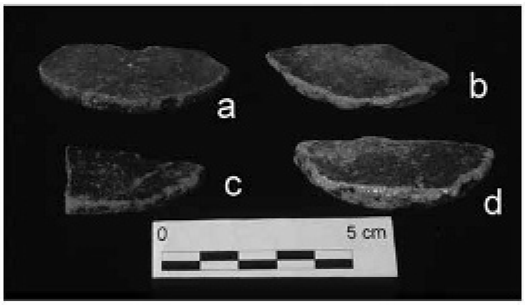
Other Worked Sherds with Smoothed Edges

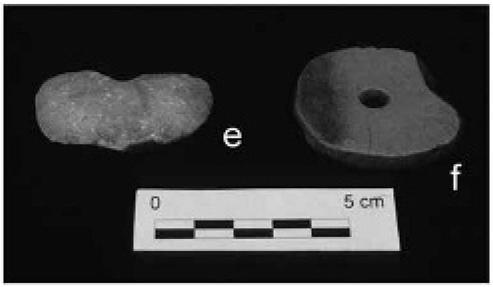
The reshaped sherds with well-smoothed worked edges tend to be smaller than those with rough edges, measuring 1 to 10 cm in length (Table 3.3, Figure 3.4a–c, e, f). Many of them, in particular the very small disks (Cat. 21A1489-1, 23A2268-1, and 23B852-1), may have been ornaments or toys. However, two worked sherds of elongated rounded shape (Cat. 21A1431-1 and 22A2031-1) could have been scrapers for ceramic manufacturing (see López Varela et al. 2002).

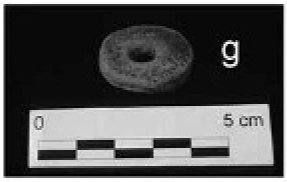
Worked Sherds with Rough Edges

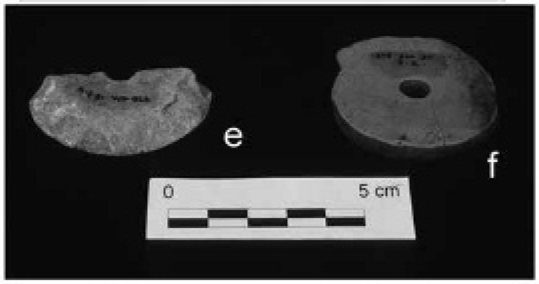
The worked sherds with rough edges tend to be larger than worked sherds with smooth edges, measuring 7 to 23 cm in length (Table 3.4; Figures 3.5, 3.6, 3.7). Most of them are roughly round or oval. Although their edges are rough, their shapes are too regular to be naturally broken fragments. The sample from Structure M8-13 (Cat. 14B1005-1) was made out of the concave base and the lower body of a Tinaja/Pantano jar. The base is roughly in the center of the sherd. The edge of the concave base is heavily worn. A piece from Structure M7-34 (Cat. 21A1466-1) was made of a plain body sherd probably of a Cambio jar, and the other from this structure was the base of a cylinder vase broken along the juncture with the wall. A piece with rough edges (Cat. 24B143-1) is smaller than the others and may have had a different use (Figure 3.4d).

A significant number of these artifacts were found around Structure M8-4 (Operation 23A) in two concentrations: one on the northern side in Units 30 and 32, and the other on the southern side in Units 2, 3, and 4. Of the four pieces from the north part, Cat. 23A1881-1 and 2261-1 were made from the ring bases of Subin/Chaquiste bowls. In both cases the bases are off the center of the sherds, but they can stand on the bases. The other two were made from body parts of Encanto jars. Eleven samples were found in the southern part. Of four pieces made of the ring bases of Subin/Chaquiste bowls, Cat. 23A908-1, 910-1, and 2265-1 are broken along the rings and have relatively flat surfaces. Cat. 23A926-1 consists of lower bodies and has a concave interior surface. The base is off the center of the sherd. Cat. 23A923-1, 2264-1, and 2341-1 were made from bodies and bases of Subin/Chaquiste bowls. Cat. 23A911-1, 915-1, and 2263-1 consist of bodies of Chaquiste bowls and also include parts of the rims and the stamped ridges. Cat. 23A2262-1 was made from a body part, probably of a Cambio jar. It is significant that many of the pieces from Operation 23A have burned clay caked on their surfaces (Figure 3.8). Cat. 23A910-1, 915-1, 1881-1, 2262-1, 2254-1, 2261-1, 2262-1, and 2264-1 have clay only on the exterior









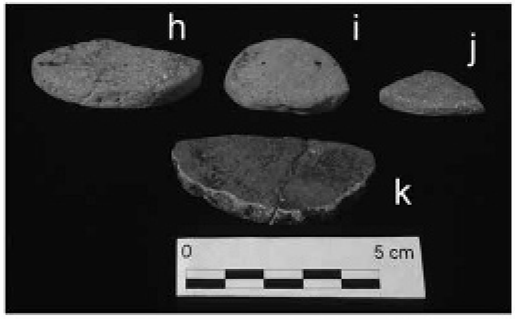


FIGURE 3.2. Medium-sized round worked ceramic disks. (a) 14B13-1-3, Cat. 984-1. (b) 14B5-2-3, Cat. 1022-1. (c) 14B14-2-1, Cat. 1021-1. (d) 14C5-3-1, Cat. 206-1. (e) 20A18-3-4, Cat. 970-1. (f) 20A24-3-2, Cat. 1205-1. (g) 21A54-3-2, Cat. 1107-1. (h) 23B12-3-3, Cat. 762-1. (i) 23B24-2-1, Cat. 761-1. (j) 23B19-3-2, Cat. 824-1. (k) 23B21-3-1, Cat. 810-1.

TABLE 3.2. Worked Sherds with Notched Ends.

PROVENIENCE	CATALOG NO.	CONDITION	CERAMIC TYPE	PART	LENGTH (cm)	WIDTH (cm)	WEIGHT (g)	EDGE
22B3-2-4	723-1	broken	Subin/Chaquiste	body without ridges		2.5	38	smooth
22B25-2-1	754-1	complete	Subin Red	rim	5.4	4.2	37	smooth
23B12-3-2	759-1	complete	Subin Red	rim	8.1	5.2	68	smooth
23B18-3-3	758-1	complete	Subin Red	rim	6.6	3.4	28	smooth
23B6-3-1	845-1	broken	Subin Red	rim		4.8	34	smooth

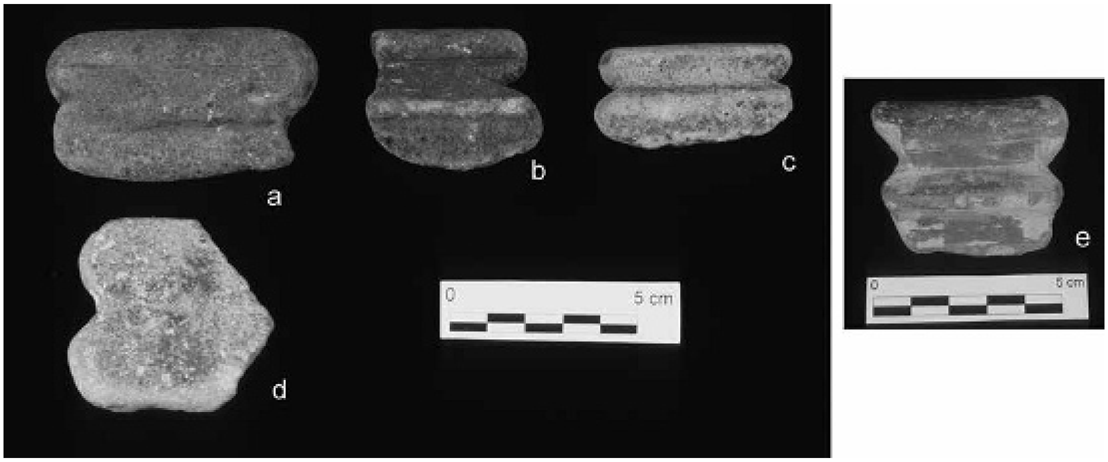


FIGURE 3.3. Notched ceramic sherds. (a) 23B12-3-2, Cat. 759-1. (b) 23B6-3-1, Cat. 845-1. (c) 23B18-3-3, Cat. 758-1. (d) 22B3-2-4, Cat. 723-1. (e) 22B25-2-1, Cat. 754-1.

TABLE 3.3. Other Worked Sherds with Smoothed Edges.

PROVENIENCE	CATALOG NO.	CONDITION	CERAMIC TYPE	PART	LENGTH (cm)	WIDTH (cm)	THICKNESS (cm)	WEIGHT (g)	FUNCTION	SHAPE	EDGE
21A76-3-2	1489-1	broken	Tinaja/ Pantano	body			0.8	5.2	ornament, toy?	oval or ellipse	smooth
21A76-3-2	1431-1	broken	Tinaja/ Pantano	body	7.0		0.8	16.2	ornament, toy?	ellipse	smooth
22A9-2-5	2031-1	broken	Polychrome?	part of the base of a bowl?	7.0	5.1	0.5	14.9	scraper?	oval	smooth
23A50-3-4	2255-1	broken	Volcanic ash tempered	body	10.0		1.0	34.0	scraper?	irregular circle	smooth
23A51-1-1	2268-1	complete	Polychrome?	body	3.6		0.9	5.1	ornament, toy?	oval	smooth
23B15-3-3	852-1	complete	Tinaja/ Pantano	body	1.2		0.7	0.9	ornament, toy?	circle	smooth

Note: The lengths, widths, and thicknesses refer to the measurements of the reworked artifacts before breakage. The weights refer to the measurement of the present samples.

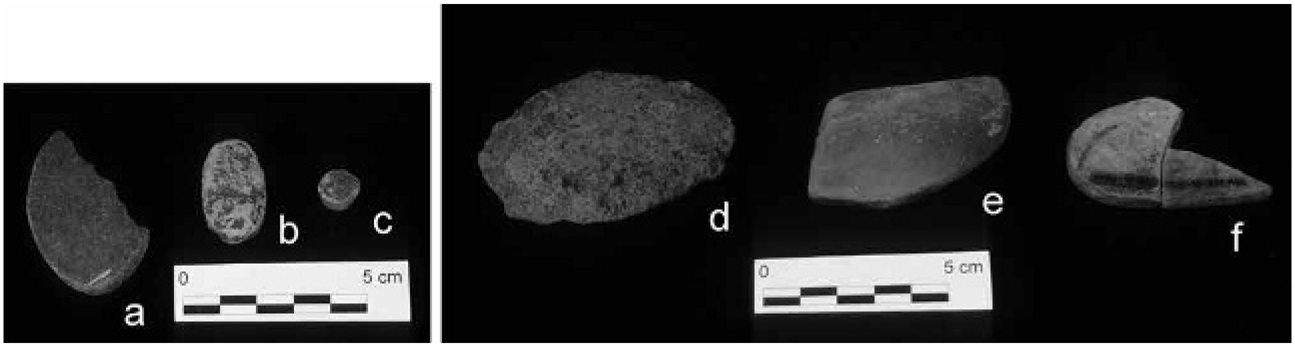


FIGURE 3.4. Worked ceramic sherds. (a–c) Worked sherds with smoothed edges. (a) 21A76-3-2, Cat. 1431-1. (b) 23A51-1-1, Cat. 2268-1. (c) 23B15-3-3, Cat. 852-1. (d) Worked sherd with rough edges (24B11-1-1, Cat. 143-1). (e–f) Worked sherds with smoothed edges. (e) 23A50-3-4, Cat. 2255-1. (f) 22A9-2-5, Cat. 2031-1.

surfaces, whereas Cat. 23A911-1 and 923-1 have a small amount of it on the interior surfaces as well. Cat. 23A926-1 has stucco-like material attached on the ring base in addition to the clay.

Large round or square worked sherds may have served various functions, including being used as spoons, shovels, plates, and lids for other vessels. Yet the high concentration around Structure M8-4, many pieces with clay attached to them, is peculiar. It should be noted that a chunk of burned clay (Cat. 23A1040-1) was found in the southern part (Lot 3-3-4) of this operation. This chunk of clay and the pieces attached to worked sherds were probably burned at the time of abandonment. The color of the clay varies from cream to light orange, but it is fine with no visible mineral inclusions. The chunk of clay contained plant fibers, and one can observe similar impressions of fibers on the relatively thick clay attached to Cat. 23A910-1. Thus, the chunk and the pieces attached to sherds from the northern and southern parts are probably the same kind of clay.

It is likely that the worked sherds around Structure M8-4 were used for manufacturing activities involving clay. One possibility is that these artifacts were used in pottery production as basal molds on which potters shaped moist clay into vessels or other forms. Modern Maya potters use concave basal molds to turn vessels while they shape them (Reina and Hill 1978:22, 79–113). To prevent the vessel from sticking to the mold, potters typically powder the molds with a parting agent such as ash, manure, pumice, or fine sand (Rice 1987:125). The worked sherds from Structure M8-4 exhibit clean interior surfaces whereas their exterior surfaces are covered with clay, which might reflect such use. However, many of them, particularly those made from the rims and bodies of ves-

Table 3.4. Worked Sherds with Rough Edges.

Provenience	Catalog No.	Condition	Type	Part	Length (cm)	Width (cm)	Weight (g)	Shape	Edge
14B27-3-4	1005-1	complete	Tinaja/Pantano	base	13.2	12.6	277	irregular circle	rough
21A40-3-4	1466-1	complete	Cambio	body	14.5	13.2	352	irregular circle	rough
21A3-2-1	1530-1	complete	Corozal	base	8.3	8.1	72	circle	rough
23A3-3-4	908-1	almost complete	Subin/Chaquiste	base	21.1	20.2	533	circle	rough
23A3-3-4	910-1	almost complete	Subin/Chaquiste	base	18.6	18.1	552	circle	rough
23A3-3-3	911-1	almost complete	Chaquiste	rim and body	23.0	17.8	580	irregular eclipse	rough
23A2-3-4	915-1	almost complete	Chaquiste	rim and body	21.8	20.7	603	rounded square	rough
23A2-3-2	923-1	complete	Subin/Chaquiste	base and body	17.7	15.6	368	irregular oval	rough
23A4-3-1	926-1	complete	Subin/Chaquiste	base	15.3	14.0	371	circle	rough
23A32-3-1	1881-1	almost complete	Subin/Chaquiste	base	15.5	15.3	341	circle, slightly oval	rough
23A30-3-2	2254-1	complete	Encanto	body	11.5	9.8	130	irregular oval	rough
23A32-3-1	2260-1	almost complete	Encanto	body	12.2	10.5	130	irregular oval	rough
23A32-3-3	2261-1	almost complete	Subin/Chaquiste	base	14.1	12.2	274	oval	rough
23A4-3-3	2262-1	complete	Cambio or Subin/ Chaquiste	body	15.9	14.8	388	irregular circle	rough
23A2-3-1	2263-1	complete	Chaquiste	rim and body	15.3	14.1	248	oval	rough
23A4-3-3	2264-1	almost complete	Subin/Chaquiste	base and body	14.1	13.6	208	irregular circle	rough
23A4-3-3	2265-1	almost complete	Subin/Chaquiste	base	16.9	17.1	440	circle	rough
23A4-3-3	2341-1	almost complete	Subin/Chaquiste	base and body	22.1	22.0	479	irregular circle	rough
24B11-1-1	143-1	complete	Cambio/Pedregal	body	7.5	7.2	50.2	irregular circle	rough

Note: The lengths, widths, and thicknesses refer to the measurements of the reworked artifacts before breakage. The weights refer to the measurement of the present samples.

sels, do not exhibit clear use-wear resulting from turning and do not appear to have been used as basal molds. Some even have asymmetrical concave surfaces, which are probably not adequate for basal molds. In addition, the inner curvatures of most worked sherds do not appear to fit the bases of known ceramic vessels from Aguateca. The only probable exceptions are the worked sherds with flat bases from Structure M8-4, which could have been used for basal molds for the production of cylinder vases. Elaborately painted vases were typically made by elite artists (Reents-Budet 1994).

Another, more likely, possibility is that they were used in figurine production. In Structure M8-4, where there were numerous worked sherds, two figurine molds were found. In Structure M7-34, where there were two large worked sherds, excavators found two figurine molds, one in close proximity to a worked sherd (Chapters 2 and 14). Thus, there is a close correlation between the distributions of large worked sherds and figurine molds. Yet another possibility is that the sherds were used for purposes other than the production of ceramic vessels or figurines. The clay attached to the worked sherds found in Structure M8-4, as well as a chunk of clay found on the southern side of Structure M8-4, is fine with no visible mineral inclusions, but contained a significant amount of plant fibers. Ceramic vessels or figurines from Aguateca contain virtually no organic temper. It is not clear whether the artisans were going to remove the organic inclusions and add mineral temper later or whether they were using the clay for other purposes.

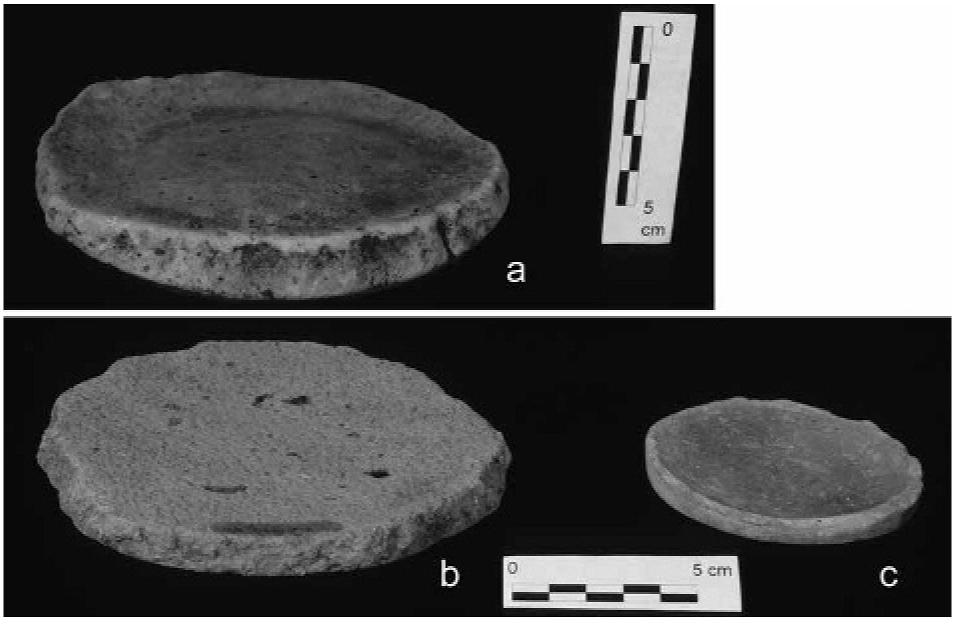


Figure 3.5. Worked ceramic sherds with rough edges from Structures M8-13 and M7-34. (a) 14B27-3-4, Cat. 1005-1. (b) 21A40-3-4, Cat. 1466-1. (c) 21A3-2-1, Cat. 1530-1.

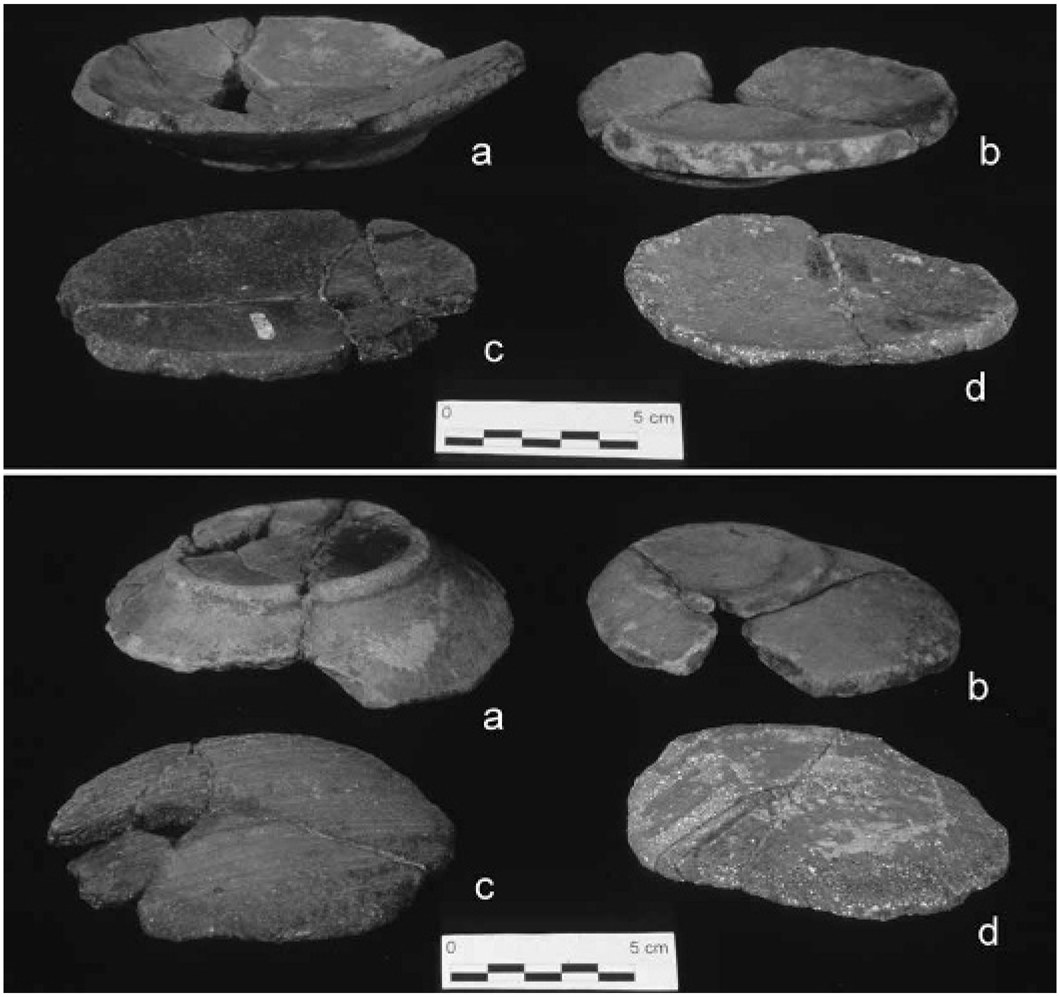


Figure 3.6. Worked ceramic sherds with rough edges from the northern part of Structure M8-4. (a) 23A32-3-1, Cat. 1881-1. (b) 23A32-3-3, Cat. 2261-1. (c) 23A32-3-1, Cat. 2260-1. (d) 23A30-3-2, Cat. 2254-1.

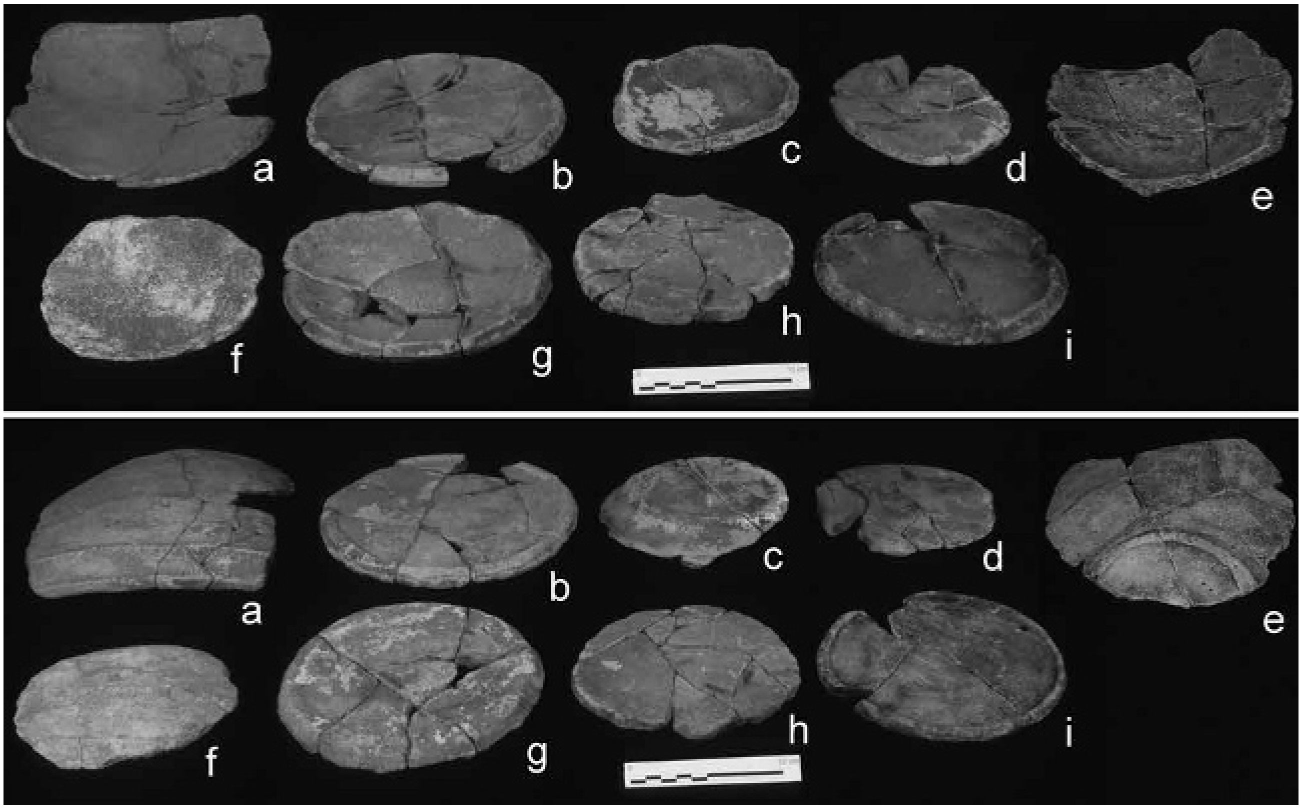


Figure 3.7. Worked ceramic sherds with rough edges from the southern part of Structure M8-4. (⅕ scale) (a) 23A2-3-4, Cat. 915-1. (b) 23A3-3-4, Cat. 908-1. (c) 23A4-3-1, Cat. 926-1. (d) 23A4-3-3, Cat. 2264-1. (e) 23A4-3-3, Cat. 2341-1. (f) 23A2-3-1, Cat. 2263-1. (g) 23A3-3-4, Cat. 910-1. (h) 23A4-3-3, Cat. 2262-1. (i) 23A4-3-3, Cat. 2265-1.

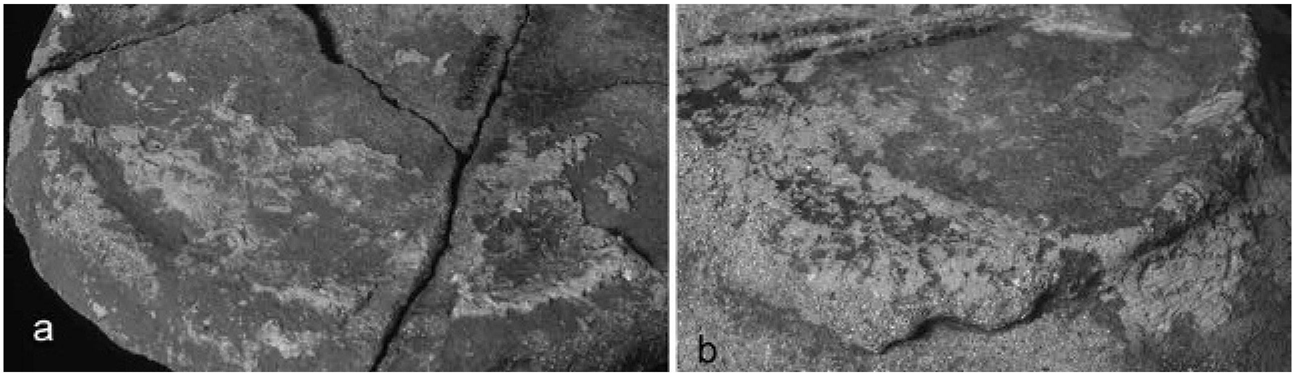


Figure 3.8. Clay caked on worked sherds. (a) 23A3-3-4, Cat. 910-1. (b) 23A4-3-1, Cat. 926-1. (Photographs are not to scale.)

OTHER CERAMIC ARTIFACTS

The category of other ceramic artifacts is divided into six subgroups: (1) beads and rings, (2) rectangular disks, (3) small round disks with a hole, (4) grooved objects, (5) other forms, and (6) unfired clay.

Ceramic Beads and Rings

Four out of the six excavated ceramic beads and rings are from the termination ritual deposits of Structure M7-32 (Operation 22B), two in the center room (Unit 42) and two on the northern side (Units 39 and 55) (Table 3.5., Figure 3.9). Cat. 22B506-1 is similar in shape to common subspherical stone beads, whereas Cat. 22B550-1 is larger than most stone beads; Cat. 22B589-1 is identical in shape to some stone tubular beads. These beads, as well as the piece from Structure M8-4 (Operation 23A), were probably parts of strung ornaments. Found in front of Structure M8-3, Cat. 23B851-1 appears to be a fragment of a ceramic

Table 3.5. Ceramic Beads.

Provenience	Catalog No.	Condition	Form	Height (cm)	Diameter (cm)	Weight (g)	Paint	Paste grain	Paste color
22B42-3-1	456-1	broken	oval longitudinal section	2.0		1.7	eroded	medium	5YR5/6
22B39-3-1	506-1	complete	subspherical (flattened sphere)	0.7	0.9	0.5	eroded	medium	7.5YR5/2
22B42-3-3	550-1	broken	oval longitudinal section	2.1	2.1	6.7	red paint	medium	5YR6/6
22B55-3-2	589-1	complete	tubular, round cross section	5.2	1.0	5.1	eroded	medium	5YR4/6
23A11-3-4	788-1	complete	subspherical (flattened sphere)	0.4	0.6	0.1	eroded	fine	2.5YR6/6
23B14-3-2	851-1	broken	thick ring	0.6		1.7	eroded	fine	2.5YR5/8

Note: Heights and diameters were measured for the pieces that preserved the original dimensions. Weights refer to the measurements of the present samples. See Chapter 6 for explanations of forms.

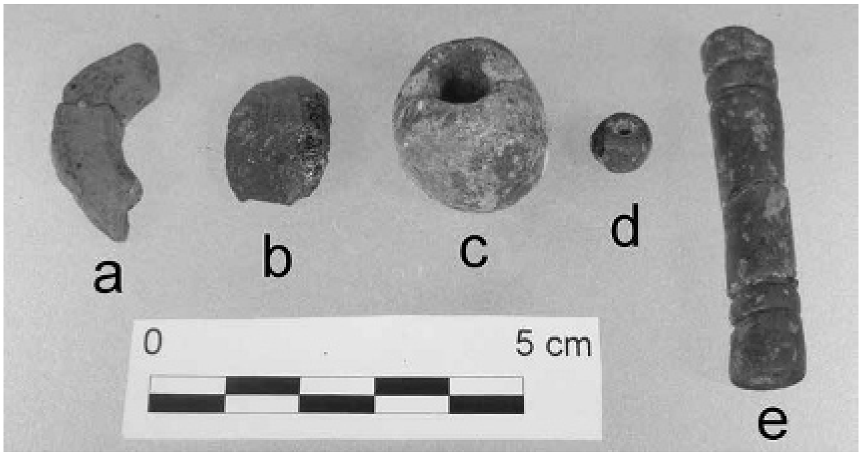


Figure 3.9. Ceramic beads and rings. (1/1 scale) (a) 23B14-3-2, Cat. 851-1. (b) 22B42-3-1, Cat. 456-1. (c) 22B42-3-3, Cat. 550-1. (d) 22B39-3-1, Cat. 506-1. (e) 22B55-3-2, Cat. 589-1.

ring and may also have served as an ornament. Given the abundance of stone ornaments, the relative scarcity of ceramic beads is probably not due to abandonment processes. They do not appear to have been objects commonly owned by the residents of the Aguateca epicenter. Similar objects have been found in various Maya sites, including Altar de Sacrificios (Willey 1972), Piedras Negras (Coe 1959:Figures 58, 59), and Mayapan (Proskouriakoff 1963).

Rectangular Ceramic Disks

All three examples of rectangular disks have slightly curved cross sections (Table 3.6, Figure 3.10a and b). These objects might have been used as ornaments. Cat. 20A1706-1 does not have holes. It is heavily eroded, but its convex side is smooth whereas the concave side is rough. The paste appears to have volcanic ash temper. Cat. 20A1705-1 has two holes that were made before firing. Its concave side is polished and painted in red, whereas the convex side has a rough, unpainted surface. The paste is fine and similar to that of polychrome vessels. Cat. 23B760-1 may have notched corners and four holes that appear to have been perforated after firing. The concave side is painted in red, but the convex side may have been unslipped. The paste is fine and similar to that of polychrome vessels.

In a burial at Altar de Sacrificios, investigators found two rectangular ceramic objects with curved cross sections with a hole at each end (Willey 1972:Figure 73). Their convex sides are covered with gray-green stucco in imitation of jade. The objects from Aguateca may have been used in a similar manner. Willey (1978:44) has also reported seven rectangular worked sherds that are perforated.

Small Round Disks with a Hole

We found three small ceramic disks with a hole in the center (Table 3.6, Figure 3.10c–e). They are in rough circular shapes with diameters measuring from 2.8 to 3.5 cm.

Table 3.6. Other Ceramic Artifacts.

Provenience	Catalog No.	Condition	Length/ Diameter (cm)	Width (cm)	Height/ Thickness (cm)	Hole Diameter (cm)	Weight (g)	Category
20A13-3-3	1705-1	broken		4.0	0.9		18.5	rectangular disk
20A44-3-1	1706-1	complete	4.5		0.6		6.0	rectangular disk
23B6-3-4	760-1	broken	7.2	3.6	1.5		7.9	rectangular disk
22B15-2-1	325-1	broken	2.8		0.4	0.18	1.9	round disk with a hole
23A36-3-2	1794-1	complete	2.8	2.6	0.5	0.35	3.3	round disk with a hole
23B12-3-2	843-1	broken	3.5		0.6	0.17	2.2	round disk with a hole
22A18-3-1	892-1	complete	3.3		1.9		11.6	grooved object
22A9-1-1	120-1	almost complete	3.5		1.8		8.4	grooved object
14B5-1-4	388-1	almost complete	3.1	1.0	0.4		1.4	other form
14B21-2-1	655-1	broken			0.4		2.1	other form
21A17-2-2	851-1	broken		1.3	0.6		4.6	other form
22A51-2-1	2062-1	broken			0.5		1.6	other form
22A45-3-1	2096-1	broken			0.6		1.4	other form
24B13-2-1	254-1	complete	1.6	1.1	0.6		1.3	other form
25A4-3-1	127-1	broken					6.4	other form
23A3-3-4	1040-1							unfired clay
20A39-3-1	1221-1							unfired clay

Note: The lengths, widths, heights, and hole diameters refer to the measurements of the reworked artifacts before breakage. The weights refer to the measurement of the present samples.

The holes were made before firing. The disks are made of medium-grain paste with fine calcite temper and medium-sized ferruginous inclusions, similar to those of figurines. Cat. 23A1794-1 is complete and relatively well preserved, but there are no paint remains. The hole of Cat. 23B843-1 is not straight. These artifacts do not seem to have functioned as spindle whorls because they have slightly irregular shapes and the holes are too small. Such objects may have been used for ornamental purposes or may have been attached to figurines. During the Petexbatun Project, two similar objects were found associated with Structure M8-19. Willey (1972:85, Figure 68) has reported similar objects from Altar de Sacrificios, which have red paint on one side and gray-green stucco on the other.

Grooved Objects

Two oval-shaped objects found in Operation 22A have grooves that were made before firing (Table 3.6, Figure 3.10f). They are made of relatively fine paste with inclusions of calcite, ferruginous particles, and probable volcanic ash. There are no remains of paint. A similar object found at Altar de Sacrificios is made of Fine Orange paste and painted in red (Willey 1972:Figure 70). It has been suggested that these objects were used as fishnet weights, but Kovacevich (2006:Figures 5.15, 5.32, 6.6) has recovered nearly identical objects from probable jade and pyrite workshops at Cancuen and has interpreted them as string-saw anchors. The artifacts from Aguateca may have served the same function.

Other Forms

The category of other forms includes objects that do not fit any of the categories discussed above (Table 3.6). Cat. 14B388-1 is a bar-shaped object with a hole near one end. Its paste has waxy texture similar to the masks made of clay and textile from Operation 22A. Its function is not clear. Cat. 14B655-1 is a fragment of a hollow hemispherical object that may have been part of a vessel (Figure 3.10g). Incised lines depict an anthropomorphic profile. It is made of fine, compact, orange paste and appears to have brown slip. Cat. 21A851-1 has a bar-like shape with two broken ends. It has medium-grain paste with calcite and ferruginous temper and may have been part of a figurine. Cat. 22A2062-1 and 22A2096-1 may have been parts of a vessel that had basket-like openings in its wall (Figure 3.10h, i). Their paste is similar to that of polychrome vessels, and their convex surfaces have red paint over a cream underslip whereas the concave sides are unslipped. Cat. 24B254-1 has a teardrop shape without holes. Its function is not clear. Cat. 25A12701 is in the shape of a

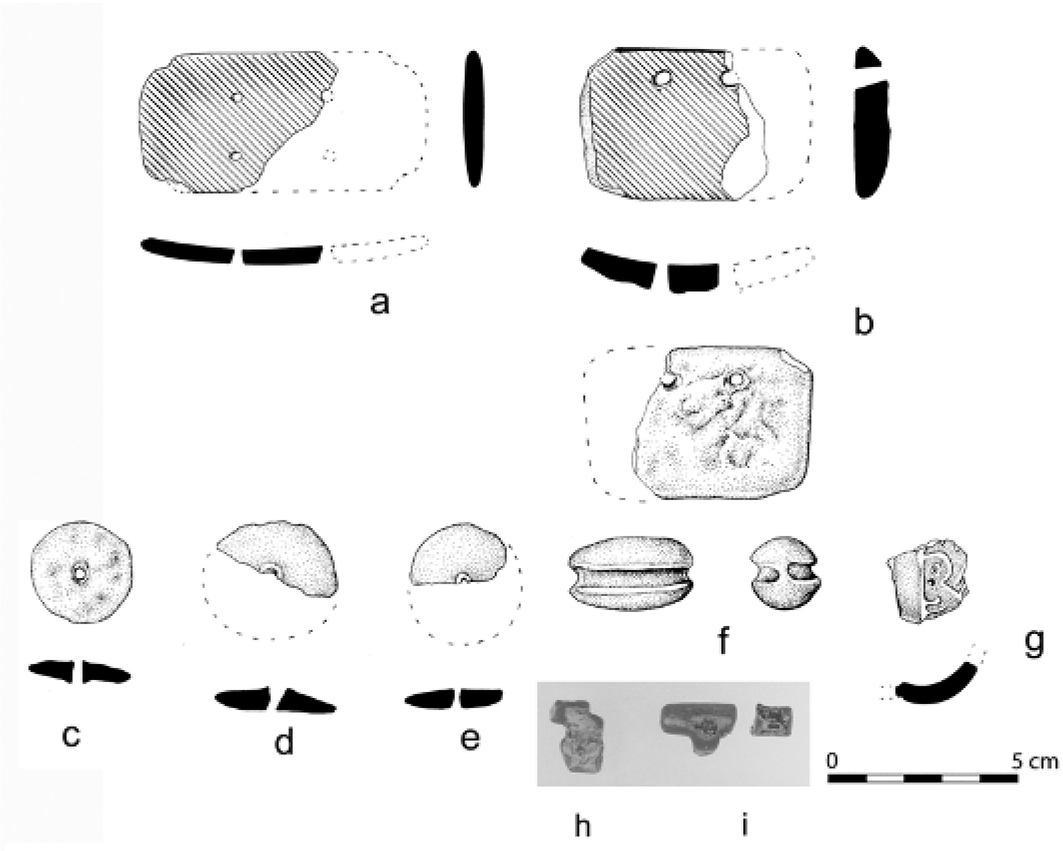


Figure 3.10. Other ceramic artifacts. (a, b) Rectangular disks. (a) 20A13-3-3, Cat. 1705-1. (b) 23B6-3-4, Cat. 260-1. (c–e) Small round disks with a hole. (c) 23A36-3-2, Cat. 1794-1. (d) 23B12-3-2, Cat. 843-1. (e) 22B15-2-1, Cat. 325-1. (f) Grooved ceramic object, 22A18-3-1, Cat. 892-1. (g–i) Other forms. (g) 14B21-2-1, Cat. 655-1. (h) 22A45-3-1, Cat. 2096-1. (i) 22A51-2-1, Cat. 2062-1.

spike with a broken base and is painted red. It may have been part of an incense burner, but its paste with calcite temper is finer than that of most *incensarios*.

Unfired Clay

Two chunks of unfired clay were recovered. One was found on the southern side of Structure M8-4 (23A3-3-4, Cat. 1040-1; Figure 3.11). It was roughly 12 cm in length and appears to have been fired when the structure was burned. Its size and shape clearly distinguished it from burned daubs originating from buildings. As discussed above, excavators unearthed eleven worked sherds, some of which were caked with clay. It is probable that artisans worked on clay in this area. We could not see any temper with the naked eye, but possible impressions of plant fibers were visible under a low-power microscope. The clay did not resemble pastes of any ceramic vessels or figurines from the site. It is still possible that artisans intended to add temper to this clay for later use.

The other specimen was found behind Structure M8-8 (20A39-3-1, Cat. 1221-1). It was not fired and did not contain visible temper. In the same area, excavators unearthed jars, bowls, figurines, and lithics, but we did not identify artifacts clearly related to the production of ceramic vessels or figurines.

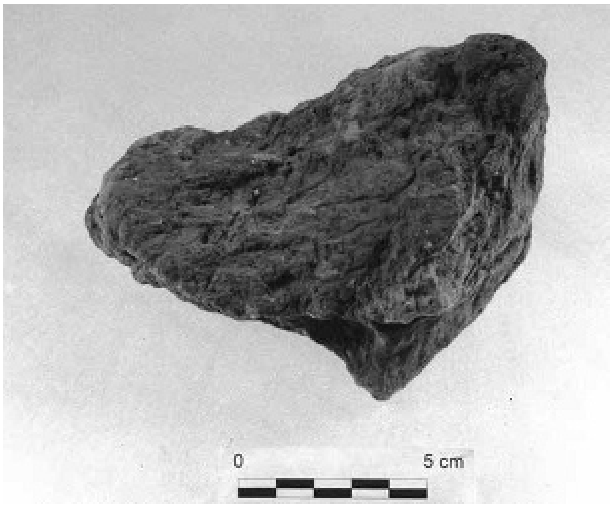


Figure 3.11. Unfired clay from Structure M8-4. 23A3-3-4, Cat. 1040-1.

chapter 4

Spindle Whorls

Takeshi Inomata

Many of the objects discussed in this chapter were most likely used as spindle whorls, although some may have served as flywheels for drills (Digby 1964; Kovacevich 2006:169, 181; Kovacevich et al. 2004). In addition, some of the perforated ceramic sherds described in Chapter 3 may have been used as spindle whorls. The spindle whorls excavated from Aguateca can be classified into four types in terms of shape (Table 4.1, Figures 4.1–4.8). Hemispheres are the most common form (e.g., Figure 4.1f, g, i). Constricted hemispheres are narrowed and distorted near the flat facets (Figures 4.2h, 4.4b). Some of them are difficult to distinguish from hemispherical pieces with deep incisions. Round shapes are similar to hemispheres but have the widest diameters of the flat facets (Figures 4.2i; 4.3f, i; 4.4c). Some of them have more flattened forms than hemispheres do. The difference between hemispheres and round shapes, however, is often not clear. Doughnut shapes, as their name indicates, have a tube-like appearance (Figures 4.5e–h, 4.8). Their holes tend to be wider near the two ends, which may suggest that they did not function as spindle whorls.

The majority of the spindle whorls were plain, but small remains of red paint were found on two pieces. It is possible that more spindle whorls were originally painted. We should also note that some spindle whorls were made out of limestone of red or yellow colors or marble-like patterns. The producers may have used these stones for their aesthetic qualities. Eleven pieces have incised decorations, including circular lines near the narrow end or the flat facet. A small number of them have radiating lines or more complex decorations.

In terms of their distribution among structures and areas, higher numbers of them were found in the elite residential buildings, Structures M8-4 and M8-8 (Table 4.2). This appears to conform to the general pattern found at other Maya sites, where spindle whorls are also common in elite residences and rare in non-elite contexts (McAnany and Plank 2001). Epigraphic, iconographic, and ethnohistorical data show that elite Maya women actively engaged in textile production from the Classic period through colonial times (Hendon 1997; Joyce 1993). The close association of spindle whorls with females allows us to develop more specific analyses of gendered spaces in individual structures. This idea is discussed in Chapter 14.

It is notable that only one spindle whorl was found in Structure M7-32 whereas Structure M7-22 contained ten of them. It is not clear whether this discrepancy points to the different sources of the termination ritual materials in the two buildings. Doughnut-shaped pieces were found only in Structures M8-2 and M8-3. This pattern may indicate that they are related to unique activities conducted in these structures, activities that may have been different from spinning.

We should also point out that no spindle whorls were found in the Barranca Escondida. This contrasts with the main Grieta, where Ishihara (2007) recovered spindle whorls and other objects related to textile production.

Table 4.1. Types and Materials of Spindle Whorls.

			Material						
Shape	Decoration	Total	Limestone	Crystallized limestone	Marble or travertine	Sandstone	Shell	Ceramics	Undetermined
Hemisphere									
	Plain	26	21	1	1	1		2	
	Circular incisions	3	1					2	
	Circular and other incisions	5	4	1					
	Incisions on the flat surface	1	1						
	Painted	2	1					1	
	Subtotal	37	28	2	1	1		5	
Constricted hemisphere									
	Plain	1							1
	Linear incisions	1		1					
	Subtotal	2		1					1
Round									
	Plain	16	13		1			1	1
	Circular incisions	1					1		
	Subtotal	17	13		1		1	1	1
Doughnut shape									
	Plain	4	3			1			
Undetermined		1							1
Total		61	44	3	2	2	1	6	3

Table 4.2. Distribution of Spindle Whorls.

			Hemisphere		Constricted hemisphere		Round		Doughnut Undetermined	
Operation	Structure	Total	Plain	Decorated	Plain	Decorated	Plain	Decorated	Plain	Undetermined
22A	M7-22	10	7	1			2			
	M7-25	1					1			
22B	M7-32	1	1							
23A	M8-4	9	4	2		1	1			1
	Patio	2					2			
20A	M8-8	15	6	4			5			
14B&C	M8-13	5	1	1	1		2			
	Patio	1	1							
23B	M8-2	4	1				2		1	
	M8-3	5	1					1	3	
21A	M7-34	5	3	2						
	M7-92	1	1							
	Other	2		1			1			
Total		61	26	11	1	1	16	1	4	1

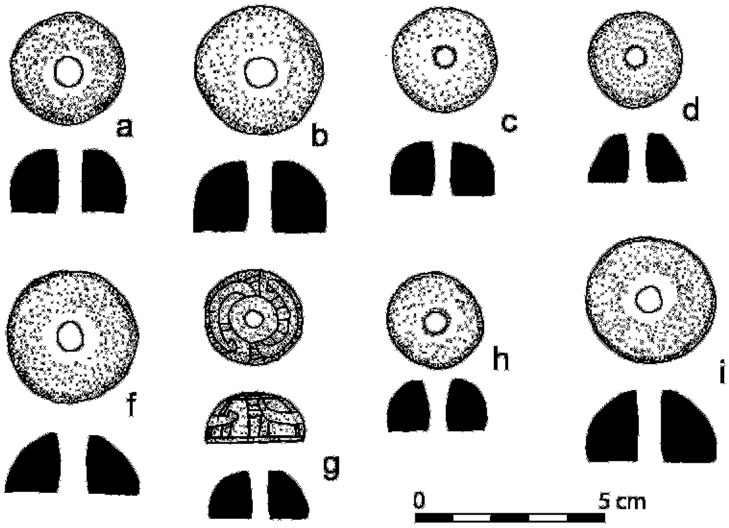


Figure 4.1. Spindle whorls from Structures M7-22 and M7-32 (Operation 22). (a) 22A10-3-2, Cat. 759-1. (b) 22A22-2-3, Cat. 271-1. (c) 22A44-3-1, Cat. 1025-1. (d) 22A20-3-1, Cat. 893-1. (e) 22A51-2-1, Cat. 2006-1. (f) 22A44-2-1, Cat. 1008-1. (g) 22A10-3-2, Cat. 758-1. (h) 22A25-3-3, Cat. 614-1. (i) 22B13-3-1, Cat. 498-1.

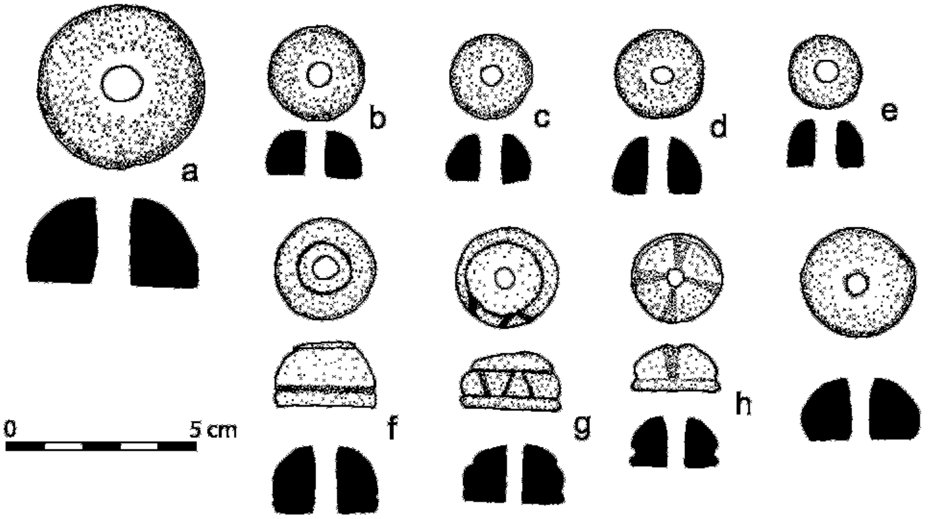


Figure 4.2. Spindle whorls from Structure M8-4 (Operation 23A). (a) 23A44-3-1, Cat. 1639-1. (b) 23A36-3-4, Cat. 1590-1. (c) 23A54-3-1, Cat. 1085-1. (d) 23A42-3-4, Cat. 1848-1. (e) 23A42-3-2, Cat. 1984-1. (f) 23A43-3-3, Cat. 1363-1. (g) 23A29-3-4, Cat. 780-1. (h) 23A16-3-1, Cat. 1914-1. (i) 23A53-3-2, Cat. 1084-1.

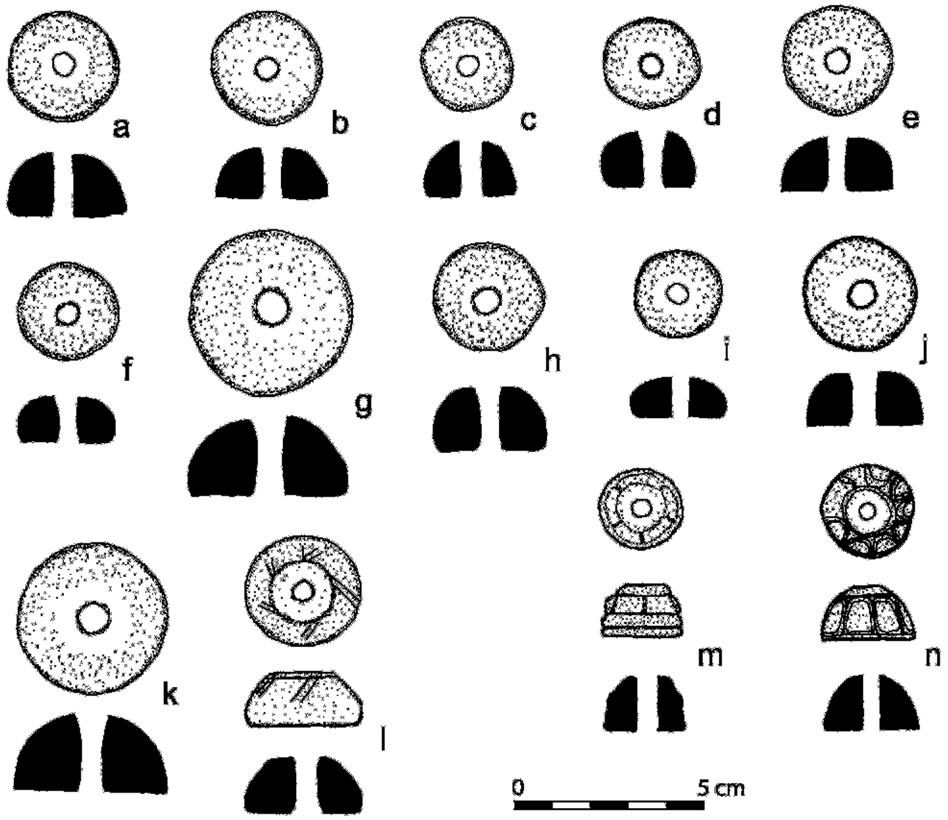


Figure 4.3. Spindle whorls from Structure M8-8 (Operation 20A). (a) 20A19-3-1, Cat. 870-1. (b) 20A19-3-1, Cat. 871-1. (c) 20A19-3-1, Cat. 954-1. (d) 20A20-3-2, Cat. 927-1. (e) 20A24-3-2, Cat. 1327-1. (f) 20A13-3-2, Cat. 590-1. (g) 20A31-3-2, Cat. 1654-1. (h) 20A17-3-4, Cat. 720-1. (i) 20A13-3-2, Cat. 591-1. (j) 20A38-3-4, Cat. 1378-1. (k) 20A35-3-1, Cat. 1613-1. (l) 20A19-3-1, Cat. 872-1. (m) 20A19-3-4, Cat. 1036-1. (n) 20A5-3-3, Cat. 253-1.

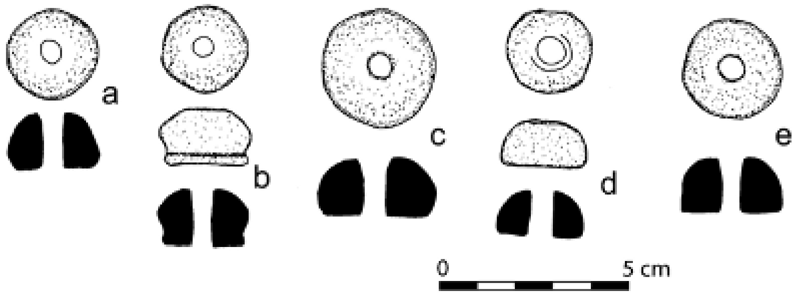


Figure 4.4. Spindle whorls from Structure M8-13 (Operation 14B). (a) 14B3-2-3, Cat. 483-1. (b) 14B20-3-3, Cat. 848-1. (c) 14B20-3-4, Cat. 847-1. (d) 14B22-2-1, Cat. 682-1. (e) 14C4-3-3, Cat. 182-1.

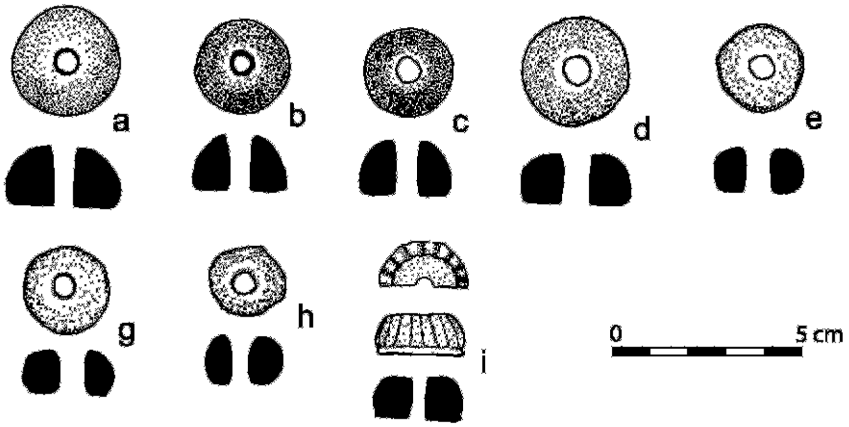


Figure 4.5. Spindle whorls from Structures M8-2 and M8-3 (Operation 23B). (a) 23B23-3-1, Cat. 622-1. (b) 23B3-3-1, Cat. 533-1. (c) 23B18-3-2, Cat. 638-1. (d) 23B5-3-1, Cat. 410-1. (e) 23B14-3-2, Cat. 489-1. (f) 23B3-3-2, Cat. 532-1. (g) 23B23-3-4, Cat. 700-1. (h) 23B2-3-4, Cat. 452-1. (i) 23B16-1-1, Cat. 155-1.

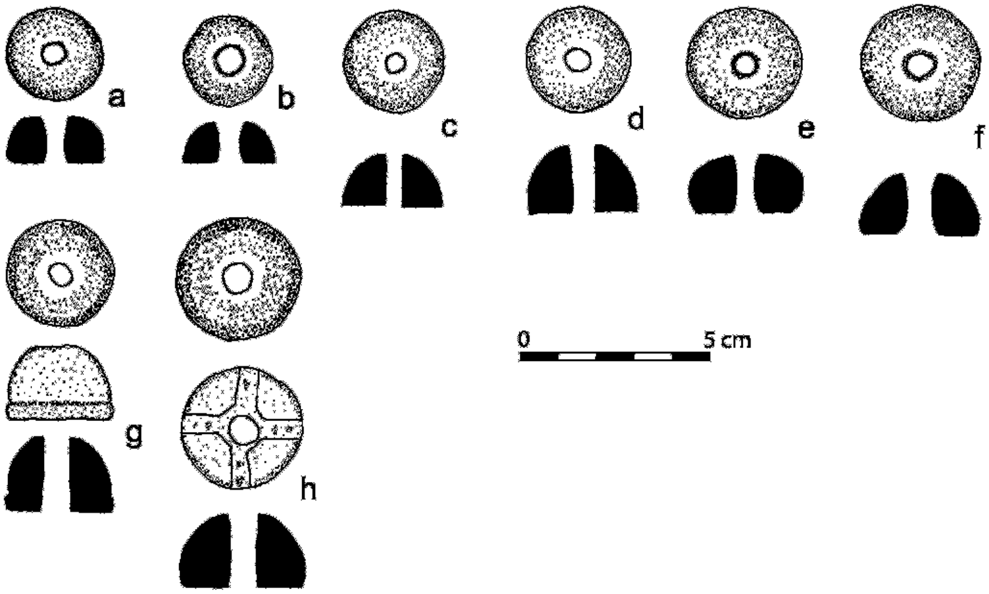


Figure 4.6. Spindle whorls from Structure M7-21 and the surrounding areas (Operation 21A). (a) 21A62-3-1, Cat. 1386-1. (b) 21A80-3-2, Cat. 1045-1. (c) 21A40-3-3, Cat. 594-1. (d) 21A25-3-3, Cat. 630-1. (e) 21A65-3-1, Cat. 1409-2. (f) 21A65-3-1, Cat. 1409-1. (g) 21A16-3-1, Cat. 367-1. (h) 21A43-3-2, Cat. 819-1.

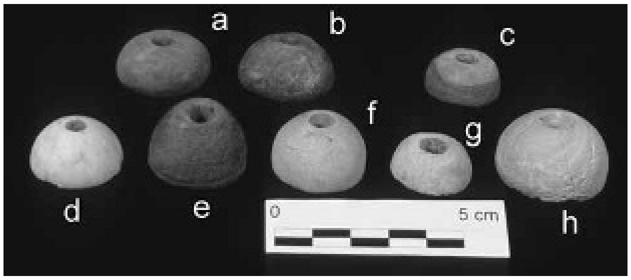


Figure 4.7. Spindle whorls from Structure M7-21 and the surrounding areas (Operation 21A). (a) 21A65-3-1, Cat. 1408-1. (b) 21A65-3-1, Cat. 1409-1. (c) 21A62-3-1, Cat. 1386-1. (d) 21A40-3-3, Cat. 594-1. (e) 21A16-3-1, Cat. 367-1. (f) 21A25-3-3, Cat. 630-1. (g) 21A8-3-2, Cat. 1045-1. (h) 21A43-3-2, Cat. 819-1.

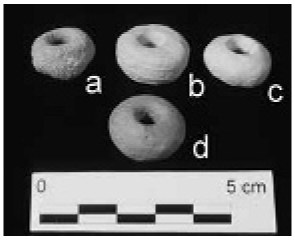


Figure 4.8. Doughnut-shaped spindle whorls from Structures M8-2 and M8-3 (Operation 23B). (a) 23B2-3-4, Cat. 452-1. (b) 23B14-3-2, Cat. 489-1. (c) 23B3-3-2, Cat. 532-1. (d) 23B23-3-4, Cat. 700-1.

chapter

5

Grinding Stones and Related Artifacts

Takeshi Inomata

This chapter discusses grinding implements, including metates, manos, doughnut stones, and what we call flat stones. The functions of doughnut stones and flat stones are still debated. The analytical procedures and classification system we used for these objects generally followed those of the Aguateca Subproject of the Petexbatun Regional Archaeological Project (Inomata 2007a). For the classification of manos, I adopted and slightly modified the system developed by Clark (1988). In a manner similar to that of ceramic analysis (see Volume 1), we assigned WMT, WMN, and WDS numbers to metates, manos, and doughnut stones, which were probably kept by the residents of the buildings in usable condition immediately before the abandonment. Fragments belonging to one original artifact were counted as one.

METATES

Metates were divided into two categories in terms of shape: basin metates and flat metates (Table 5.1, Figures 5.1–5.27). Basin-shaped metates were subdivided into shallow, deep, and unclear basins. These are the most common types of metates at Aguateca, and the majority of them were made of locally available limestone. None of the basin-shaped metates appear to have had legs. Many of flat metates were made of sandstone or igneous rock and had three legs, but flat metates made of limestone were without legs (Figure 5.14). Two flat metates have grooves along the edges of the grinding surfaces, the shallowness of which suggests that these stones were used to grind a small quantity of materials, possibly other than maize (Willey 1978:55) (Figure 5.5). One rare example was carved with a bird-like profile on the back (Figure 5.1). This fragment was found in the dense deposit in front of the easternmost room of Structure M7-22 and may have been placed originally in this storage room.

In the case of limestone metates, these different shapes do not necessarily represent different forms of the original products but more likely point to different stages of use. Most limestone metates may have been made originally with nearly flat grinding surfaces or as shallow basins, but they became deep basins as they were worn by use. In Structure M8-13, a new shallow basin metate appears to have been recently obtained by the residents (Cat. 14B552-1, WMT 14B-2); an old deep basin metate (Cat. 14B360-1, WMT 14B-1) is nearly worn through (Figures 5.17–5.19). An igneous rock metate found in the north addition of Structure M8-8 appears to have been reused after it broke (Figure 5.14d).

MANOS

Table 5.2 shows the frequencies of manos by their shapes and materials. The names of the shapes are self-explanatory, but the readers can also refer to a Petexbatun Project monograph for their illustrations (Inomata 2007a). As in the case of metates, certain shapes of limestone manos appear to represent different stages of use. Many manos may have been formed originally into regular shapes, such as round, square, lenticular, or pentagonal transversal cross sections, but they may have been worn down through use to irregular or flat shapes, such as asymmetrical elliptical, asymmetrical oval, wedge shape, or asymmetrical quadrangular sections (Figure 5.34j). Two limestone manos do not have smooth surfaces and may be preforms (23A3-3-3, Cat. 980-1, Figure 5.31j; 22B43-2-1, Cat. 367-1, Figure 5.30j).

There are many more manos than metates (272 to 152, or 1.79:1). The discrepancy was particularly large for limestone objects (241 to 94, or 2.56:1). This pattern suggests that more than one limestone mano was used for one metate, and that manos tended to wear down faster and to break more often than metates (Clark 1988; Inomata 1995:573). We found the same number of sandstone manos and metates (9 to 9), however, indicating that they were

Table 5.1. Types and Materials of Metates.

			Material				
Type	Subdivision	Total	Limestone	Sandstone	Quartzite	Conglomerate	Igneous rock
Basin	Deep basin	38	32		6		
	Shallow basin	44	33		10		1
	Unclear basin	19	16		2	1	
	Subtotal	101	81		18	1	1
Flat	With legs and grooves	3					3
	With legs and without grooves	7		5			2
	Without legs and grooves	9	7	1			1
	Not clear	13		1			12
	Subtotal	32	7	7			18
Undetermined	Undetermined	19	6	2	5		6
Total		152	94	9	23	1	25

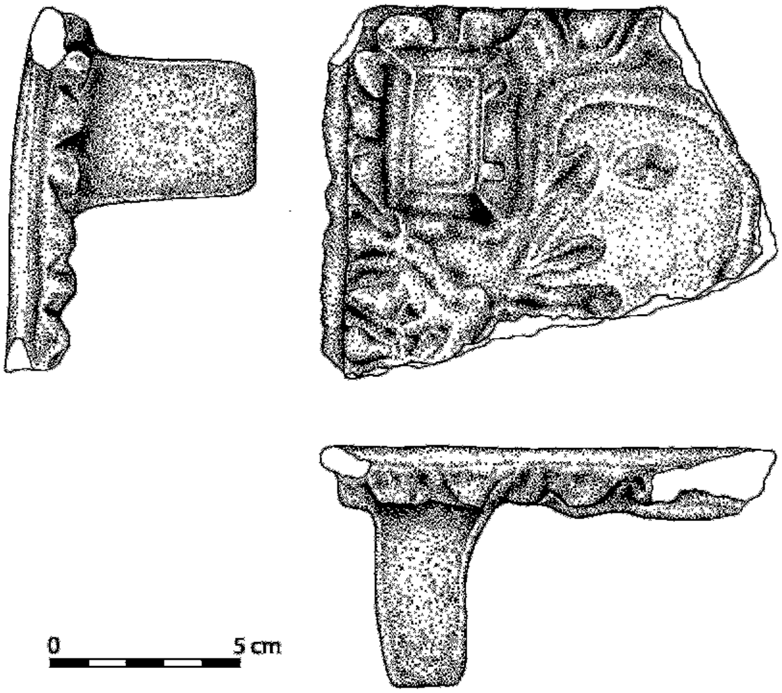


Figure 5.1. Flat igneous rock metate from Structure M7-22. 22A23-2-4, Cat. 228-1.

often used in pairs. In the cases of quartzite (12 to 23, or 1:1.92) and igneous rock (10 to 25, or 1:2.5) tools, there are fewer manos than metates. In some cases, limestone manos may have been used with quartzite or igneous rock metates. Some manos appear to have been reused after they broke (Table 5.3) (Inomata 1995:575). Some of these reused manos were probably used in vertical positions as pestles. Moholy-Nagy (2003a:38) also notes that many manos found at Tikal were reused as hammerstones. Possible use of ends was also observed for a small number of complete manos.

Distribution of Metates and Manos

The majority of metates and manos were found in the Palace Group and Causeway areas (Table 5.4). The scarcity of those objects in the Barranca Escondida is most likely related to the area's ritual functions. Given their large size and prevalence, many of the limestone basin metates and

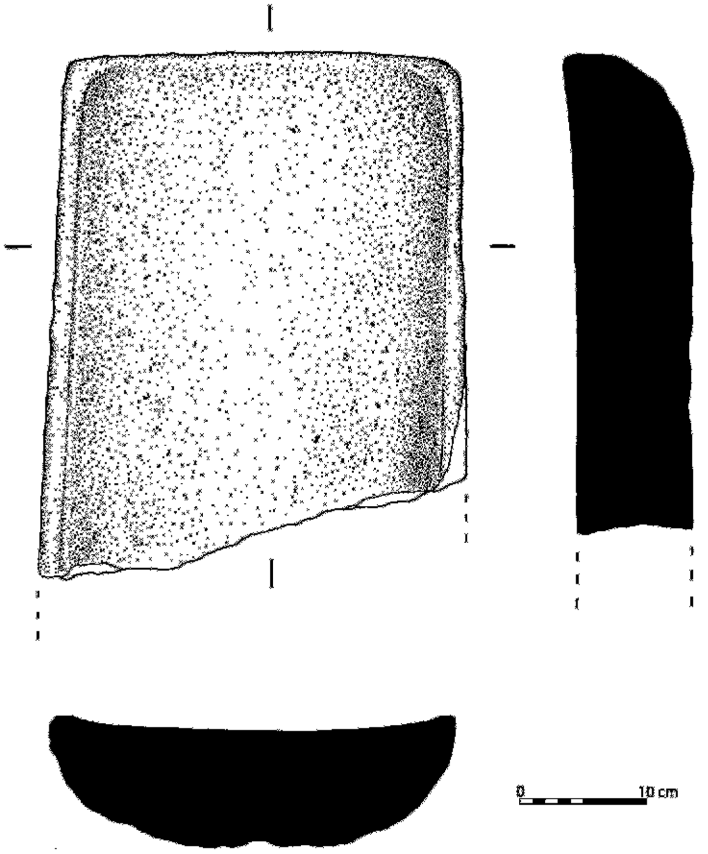


Figure 5.2. Shallow basin limestone metate from Structure M7-32. 22B35-3-1, Cat. 539-1. (⅙ scale)

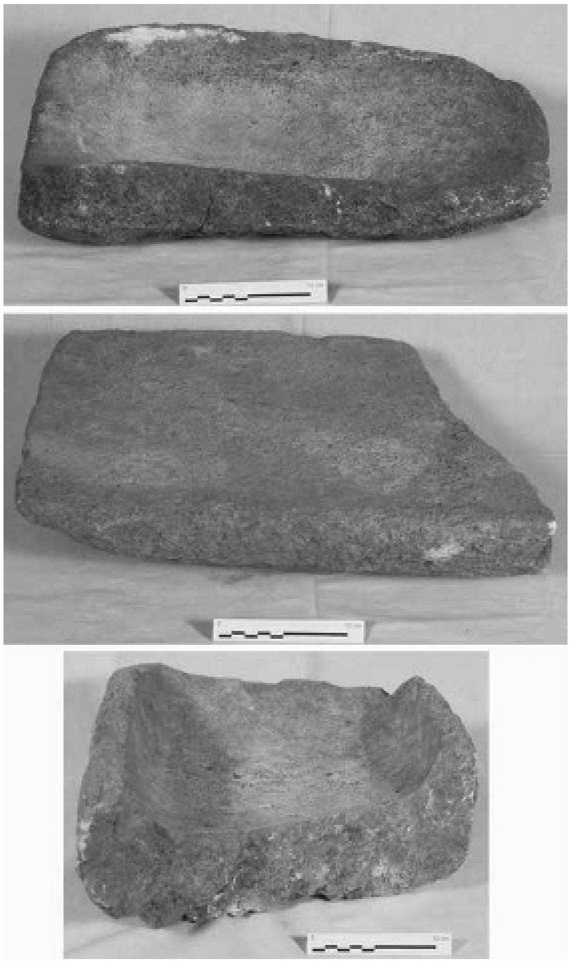


Figure 5.3. Limestone metates from Structures M7-22 and M7-32. (⅙ scale) Top: Deep basin metate, 22A26-3-1, Cat. 591-1. Middle: Shallow basin metate, 22B35-3-1, Cat. 539-1. Bottom: Deep basin metate, 22B35-3-2, Cat. 481-1.

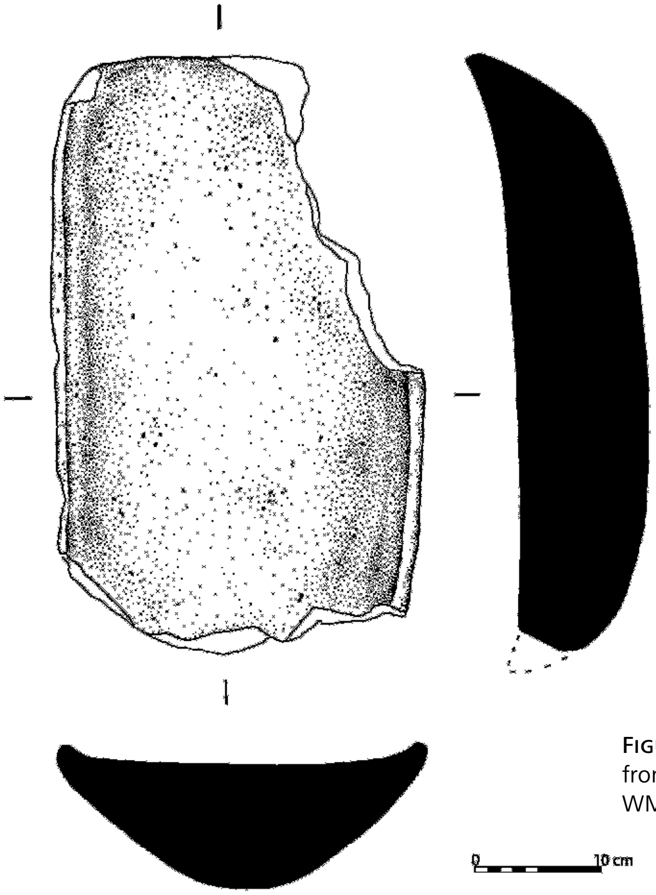


Figure 5.4. Shallow basin limestone metate from Structure M8-4. 23A42-3-2, Cat. 2062-1, WMT 23A-2. (⅙ scale)

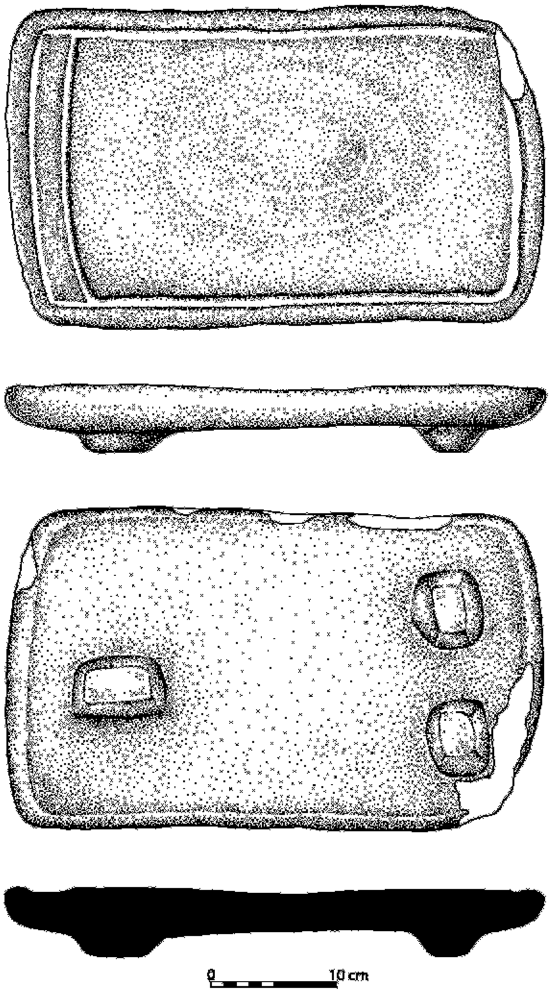


Figure 5.5. Flat igneous rock metate from Structure M8-4. 23A45-3-3, Cat. 990-1, WMT 23A-6. (⅙ scale)

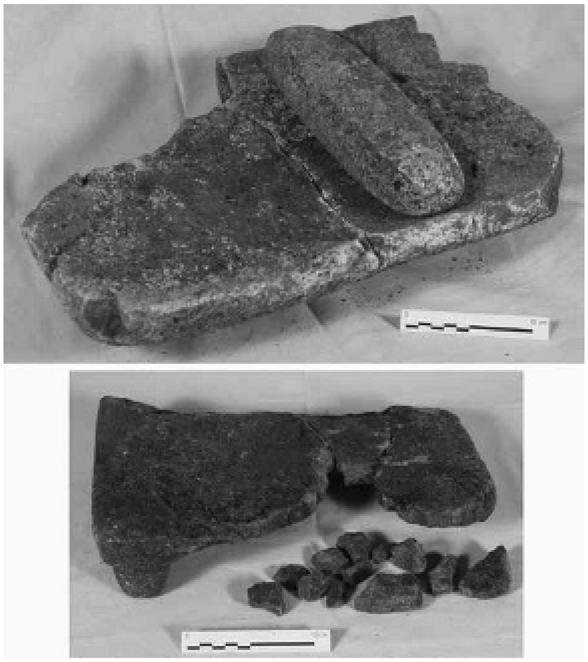


Figure 5.6. Metates from Structure M8-4. Top: Shallow basin limestone metate and matching mano. Metate: 23A42-3-2, Cat. 2062-1, WMT 23A-2. Mano: 23A42-3-2, Cat. 1927-1, WMN 23A-3. Bottom: Flat sandstone metate, 23A42-3-4, Cat. 1965-1, WMT 23A-5. (⅙ scale)

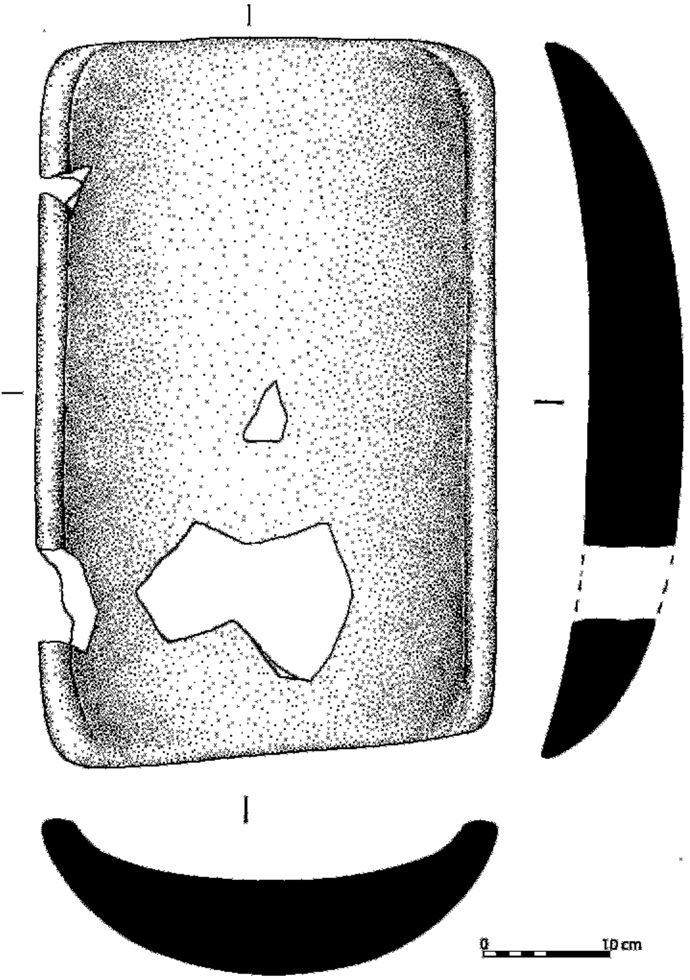


Figure 5.7. Shallow basin limestone metate from Structure M8-8. 20A20-3-3, Cat. 943-1, WMT 20A-1. (⅙ scale)

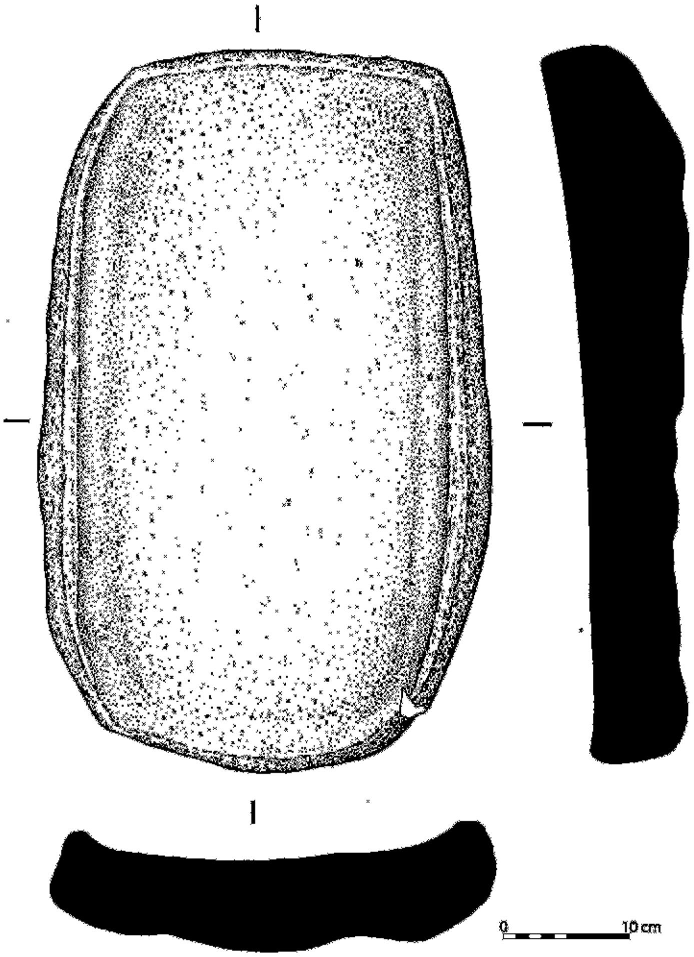


Figure 5.8. Shallow basin limestone metate from Structure M8-8. 20A6-3-3, Cat. 851-1, WMT 20A-9. (⅙ scale)

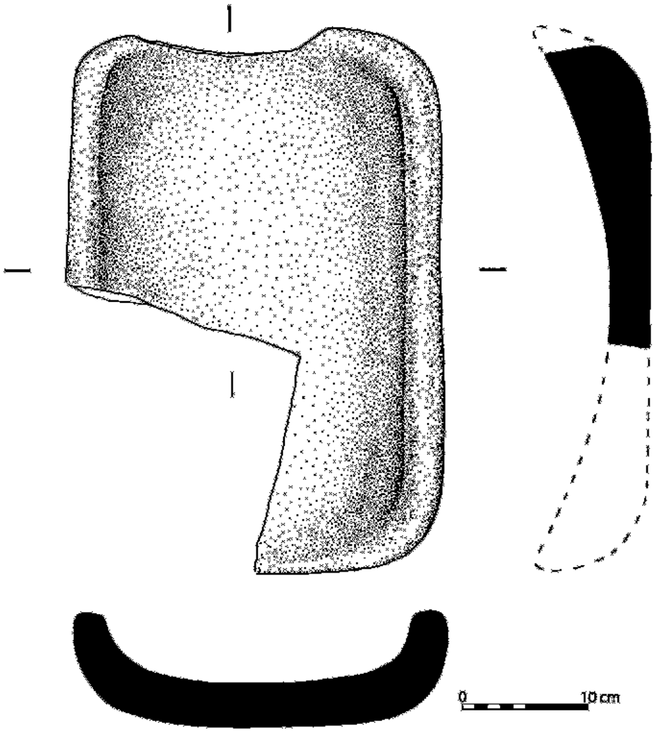


Figure 5.9. Deep basin limestone metate from Structure M8-8. 20A15-3-4, Cat. 797-1, WMT 20A-2. (⅙ scale)

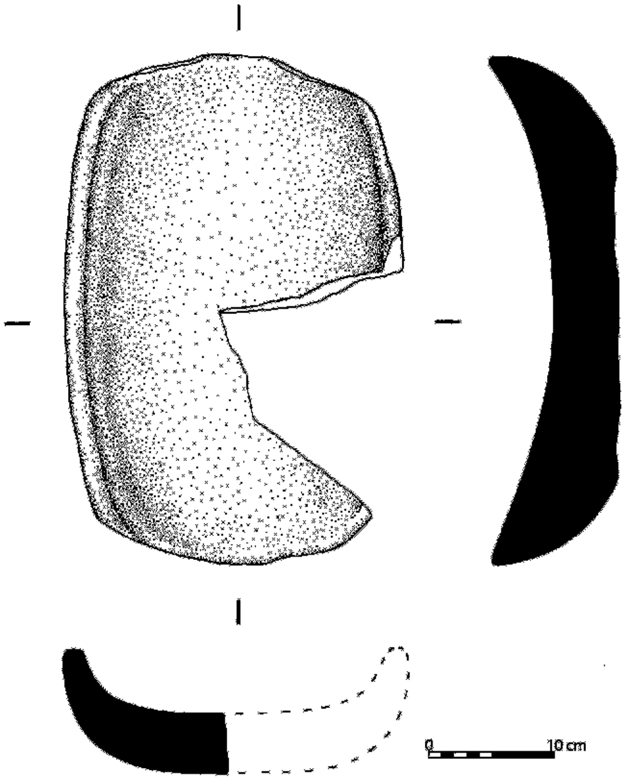


Figure 5.10. Deep basin limestone metate from Structure M8-8. 20A15-3-4, Cat. 988-1, WMT 20A-3. (⅙ scale)

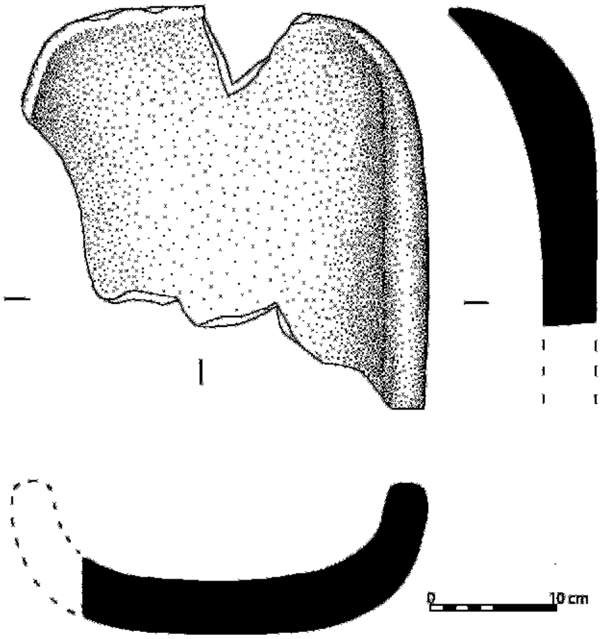


Figure 5.11. Deep basin limestone metate from Structure M8-8. 20A15-3-4, Cat. 985-1, WMT 20A-4. (⅙ scale)

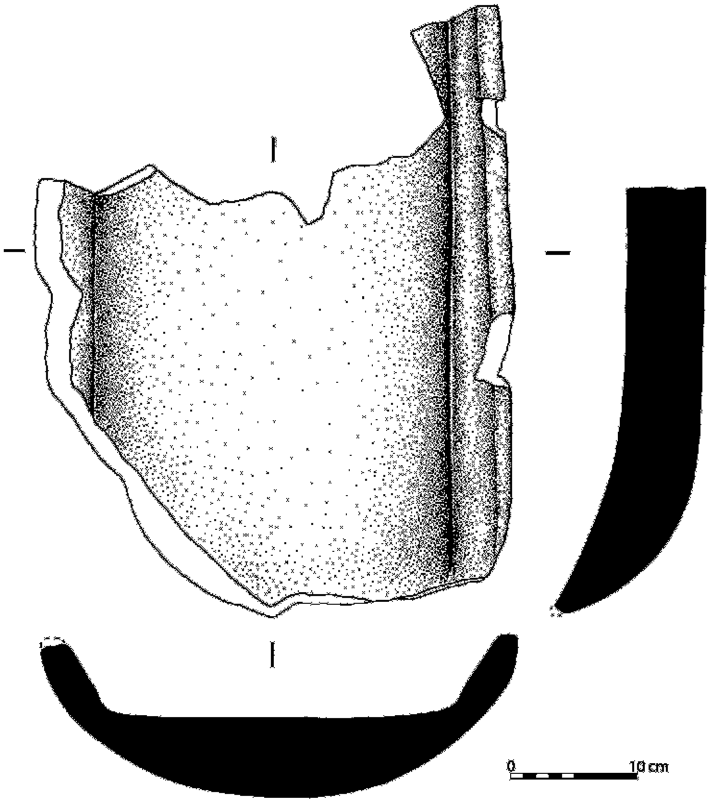


Figure 5.12. Deep basin limestone metate from Structure M8-8. 20A14-3-3, Cat. 794-1, WMT 20A-5. (⅙ scale)

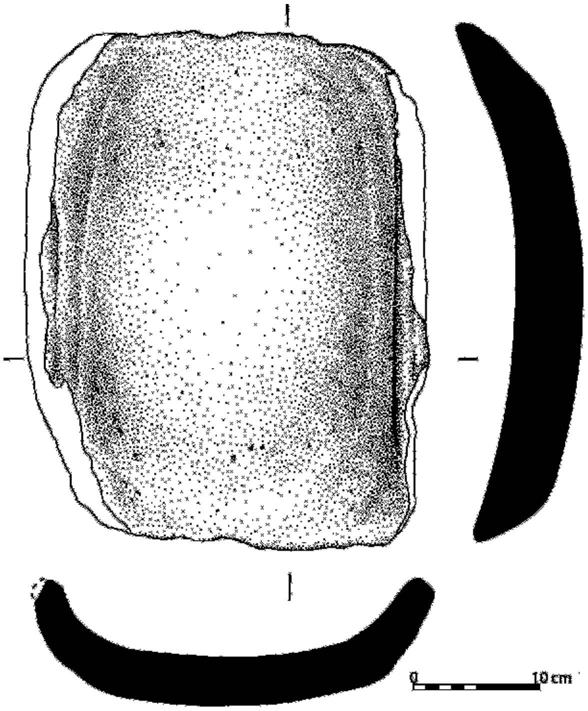


Figure 5.13. Deep basin quartzite metate from Structure M8-8. 20A6-3-3, Cat. 764-1, WMT 20A-8. (⅙ scale)

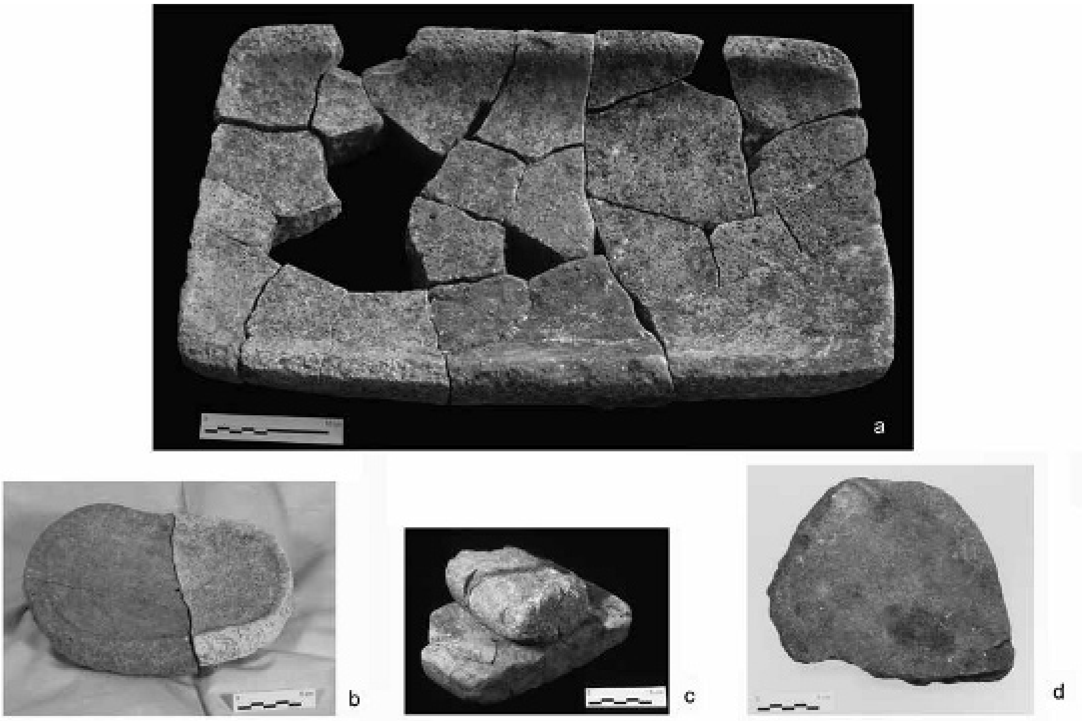


Figure 5.14. Metates from Structure M8-8. (⅙ scale) (a) Shallow basin limestone metate, 20A20-3-3, Cat. 943-1, WMT 20A-1. (b) Shallow basin limestone metate, Cat. 20A894-1, WMT 20A-10. The left fragment is from 20A18-3-1 and the right fragment is from 23A36-3-2. (c) Flat limestone metate, 20A32-2-1, Cat. 1314-1, WMT 20A-11. Possible matching mano, rectangular, rectangular, 20A32-3-1, Cat. 1648-1, WMN 20A-21. (d) Flat igneous rock metate, 20A41-3-4, Cat. 1627-1. It appears to have been reused after it broke.

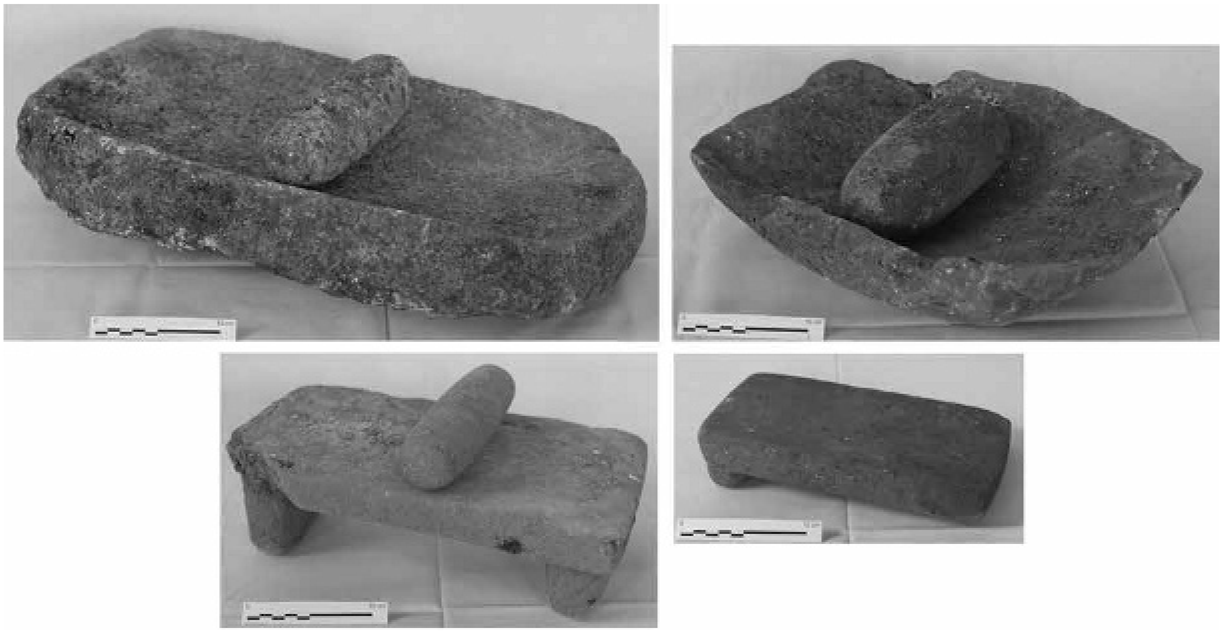


Figure 5.15. Metates and matching manos from Structure M8-8. (⅙ scale) Top left: 20A6-3-3. Shallow basin limestone metate: Cat. 851-1, WMT 20A-9. Limestone mano: Cat. 801-1, WMN 20A-3. Top right: Deep basin quartzite metate: 20A6-3-3, Cat. 764-1, WMT 20A-8. Quartzite mano: 20A15-3-4, Cat. 797-1, WMN 20A-2. Bottom left: 20A19-3-1. Flat sandstone metate: Cat. 860-1, WMT 20A-6. Sandstone mano: Cat. 867-1, WMN 20A-1. Bottom right: Flat sandstone metate: 20A6-3-3, Cat. 771-1, WMT 20A-7.

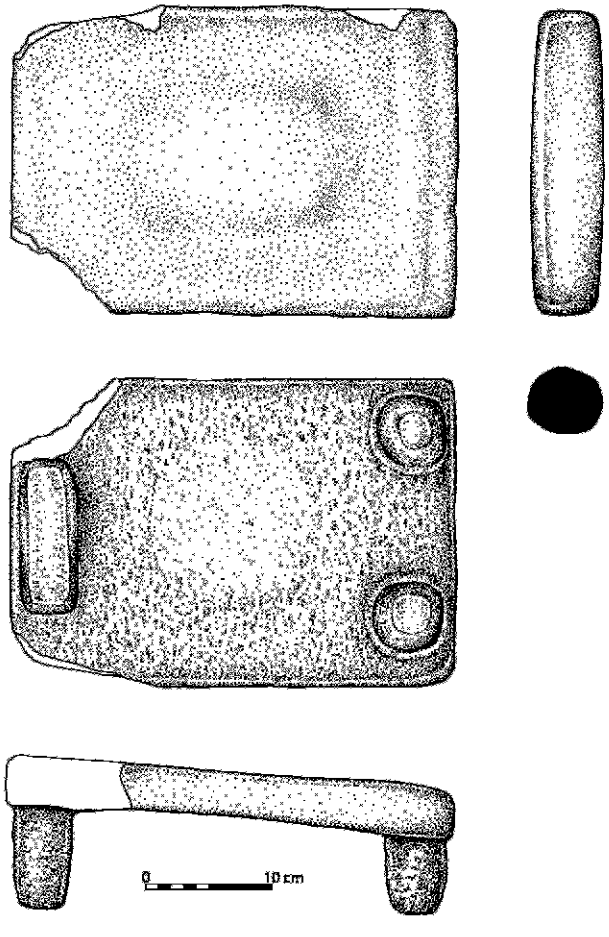


Figure 5.16. Flat sandstone metate and matching mano from Structure M8-8. 20A19-3-1. Metate: Cat. 860-1, WMT 20A-6. Mano: Cat. 867-1, WMN 20A-1. (⅙ scale)

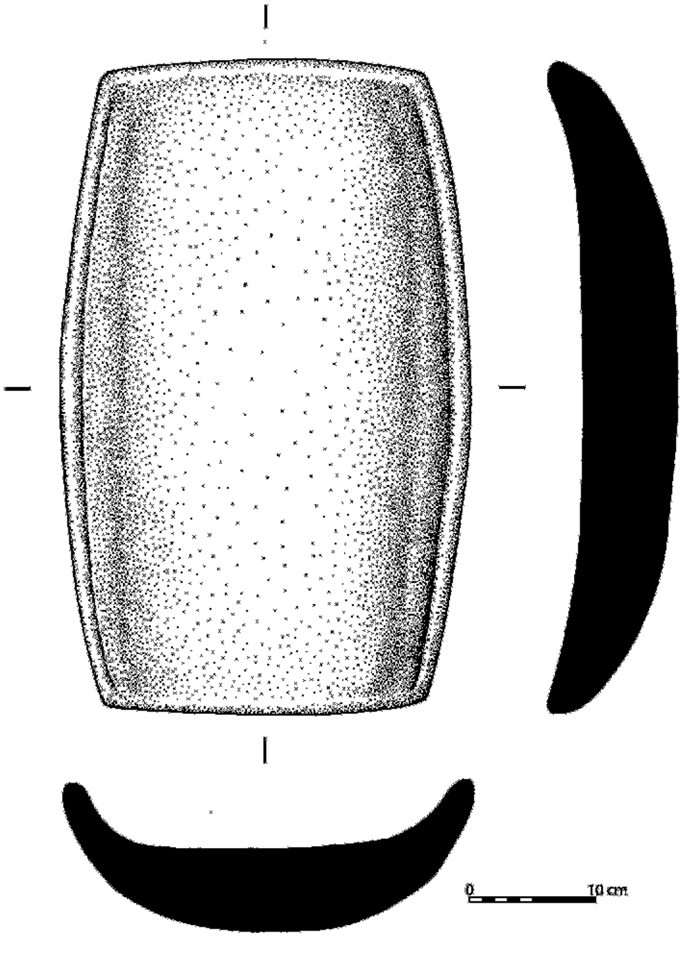


Figure 5.17. Shallow basin limestone metate from Structure M8-13. 14B1-3-4, Cat. 552-1, WMT 14B-2. (⅙ scale)

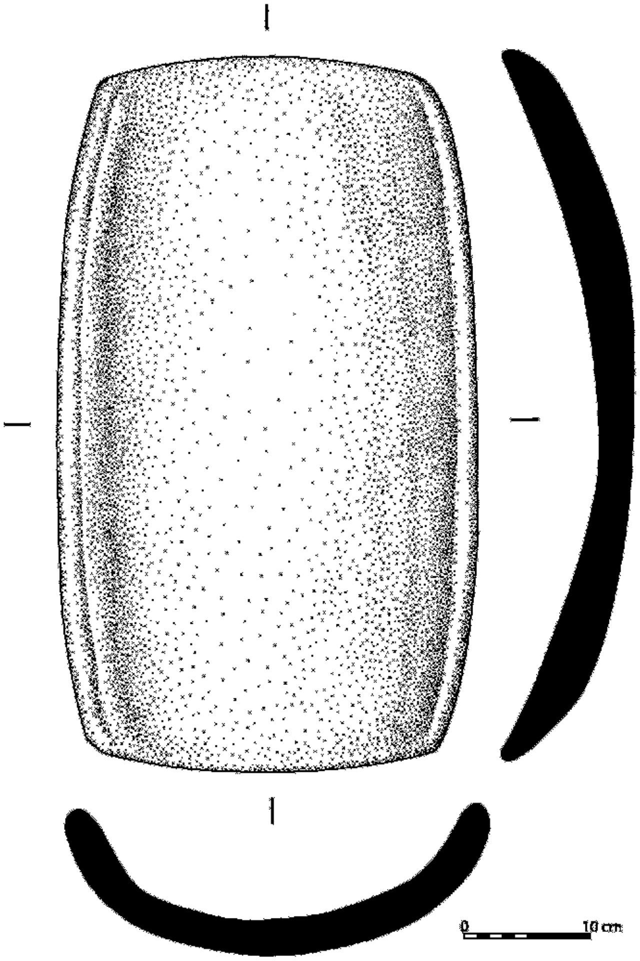


Figure 5.18. Deep basin limestone metate from Structure M8-13. 14B14-2-2, Cat. 360-1, WMT 14B-1. (⅙ scale)

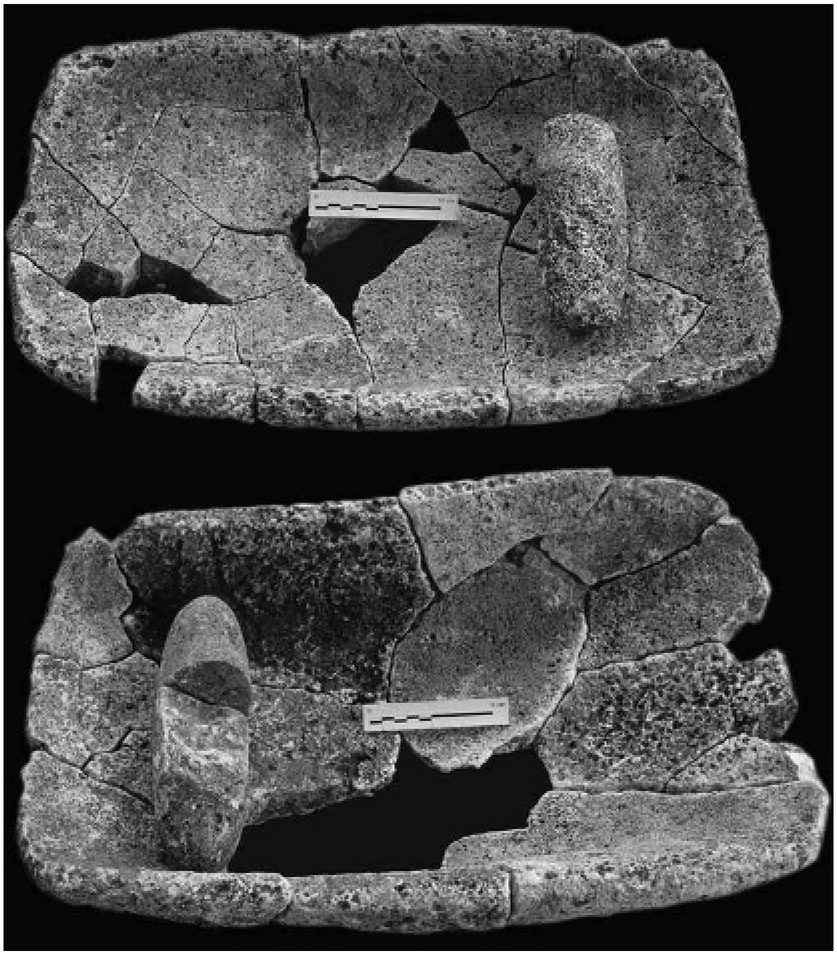


Figure 5.19. Limestone metates with matching manos from Structure M8-13. Top: Shallow basin metate, 14B1-3-4, Cat. 14B552-1, WMT 14B-2. Mano: 14B1-3-4, Cat. 558-1, WMN 14B-1. Bottom: Deep basin metate, 14B14-2-2, Cat. 360-1, WMT 14B-1. Mano: 14B3-3-2, Cat. 527-1, WMN 14B-2. (⅙ scale)

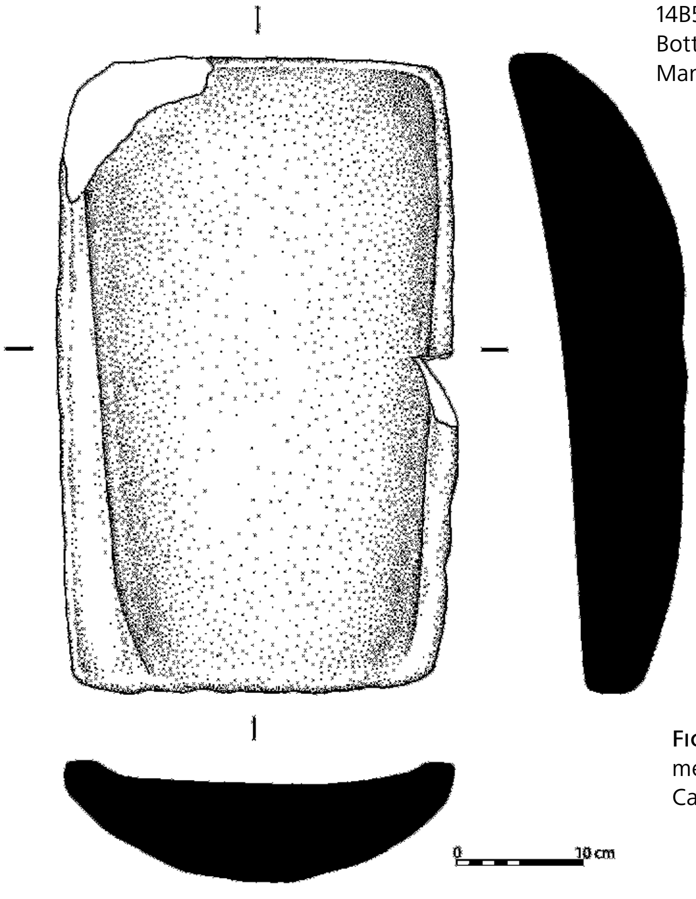


Figure 5.20. Shallow basin limestone metate from Structure M8-2. 23B5-3-3, Cat. 357-1, WMT 23B-2. (⅙ scale)

Table 5.2. Types and Materials of Manos.

Transversal section	Longitudinal section	Total	Limestone	Sandstone	Quartzite	Igneous rock
Symmetrical elliptical	Symmetrical elliptical	1	1			
	Oval	1	1			
	Subtotal	2	2			
Asymmetrical elliptical	Symmetrical elliptical	1	1			
	Rectangular	1			1	
	Not clear	1	1			
	Subtotal	3	2		1	
Symmetrical oval	Oval	3	3			
	Lenticular	7	6		1	
	Rectangular	1	1			
	Not clear	1				1
	Subtotal	12	10		1	1
Asymmetrical oval	Symmetrical elliptical	1			1	
	Asymmetrical elliptical	1	1			
	Oval	2	1		1	
	Lenticular	3	3			
	Rectangular	1		1		
	Not clear	3	3			
	Subtotal	11	8	1	2	
Round	Symmetrical elliptical	2	2			
	Oval	12	11	1		
	Lenticular	18	17	1		
	Rectangular	2	1	1		
	Not clear	12	11			1
	Subtotal	46	42	3		1
Square	Symmetrical elliptical	6	6			
	Oval	6	6			
	Lenticular	31	30	1		
	Rectangular	7	6			1
	Asymmetrical rectangular	2	1			1
	Rectangular-oval	1	1			
	Not clear	17	16			1
	Subtotal	70	66	1		3
Not-bordered plano-convex	Not clear	2	2			
Rectangular	Asymmetrical elliptical	1	1			
	Lenticular	7	7			
	Rectangular	7	6			1
	Asymmetrical rectangular	1	1			
	Not clear	2	1	1		
	Subtotal	18	16	1		1
Lenticular	Symmetrical elliptical	6	6			
	Lenticular	7	6		1	
	Rectangular	1			1	
	Not clear	2	1			1
	Subtotal	16	13		2	1

Table 5.2. (cont'd.) Types and Materials of Manos.

Transversal section	Longitudinal section	Total	Limestone	Sandstone	Quartzite	Igneous rock
Symmetrical triangular	Asymmetrical rectangular	1	1			
Wedge shape	Asymmetrical elliptical	1	1			
	Lenticular	1	1			
	Rectangular	2		2		
	Plano-convex	1			1	
	Asymmetrical rectangular	1	1			
	Not clear	4	4			
	Subtotal	10	7	2	1	
Pentagonal	Symmetrical elliptical	1	1			
	Oval	4	4			
	Lenticular	8	8			
	Not clear	3	3			
	Subtotal	16	16			
Rhomboidal	Lenticular	1	1			
	Rectangular	2	2			
	Subtotal	3	3			
Trapezoidal	Not clear	1	1			
Asymmetrical quadrangular	Symmetrical elliptical	1	1			
	Oval	5	3		2	
	Lenticular	16	15		1	
	Rectangular	4	3	1		
	Asymmetrical rectangular	1	1			
	Not clear	5	5			
	Subtotal	32	28	1	3	
Parallelogram	Symmetrical elliptical	1	1			
	Oval	2	2			
	Lenticular	5	4			1
	Rectangular	1	1			
	Not clear	2	2			
	Subtotal	11	10			1
Flat triangular	Rectangular	1	1			
Parallel lenticular	Symmetrical elliptical	1	1			
Not clear	Lenticular	2	2			
	Not clear	14	10		2	2
	Subtotal	16	12		2	2
Total		272	241	9	12	10

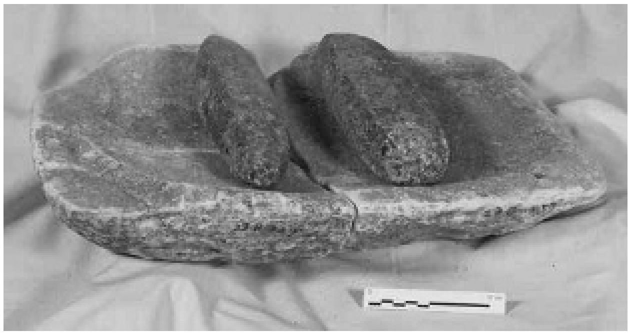


FIGURE 5.21. Shallow basin limestone metate from Structure M8-2 and matching manos from Structure M8-4. Metate: 23B5-3-3, Cat. 357-1, WMT 23B-2. Manos: Left: 23A42-3-2, Cat. 1930-1, WMN 23A-6. Right: 23A42-3-2, Cat. 1927-1, WMN 23A-3. (⅙ scale)

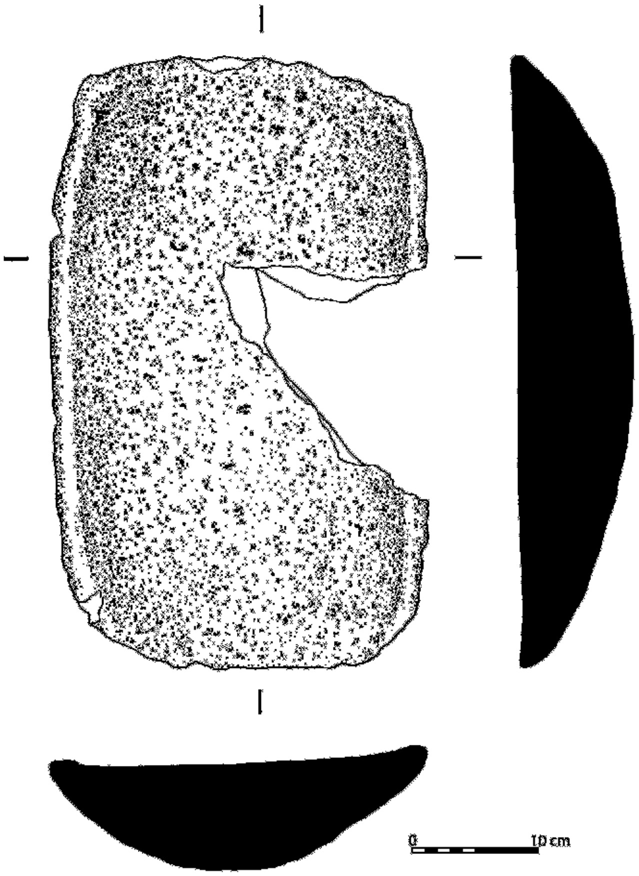


FIGURE 5.22. Flat limestone metate from Structure M7-34. 21A13-3-4, Cat. 613-1, WMT 21A-3. (⅙ scale)

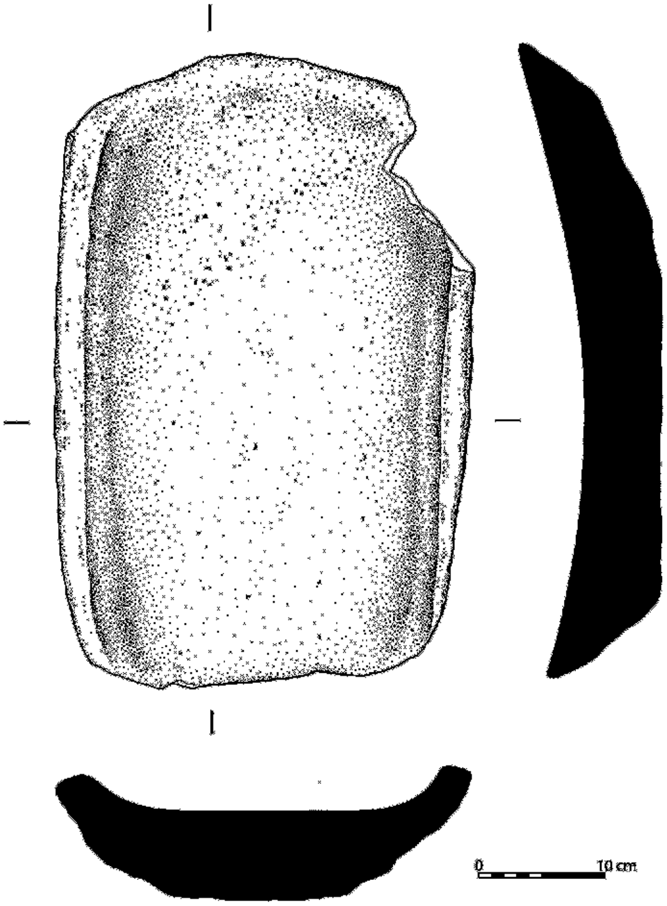


FIGURE 5.23. Shallow basin limestone metate from Structure M7-34. 21A8-3-4, Cat. 312-1, WMT 21A-2. (⅙ scale)

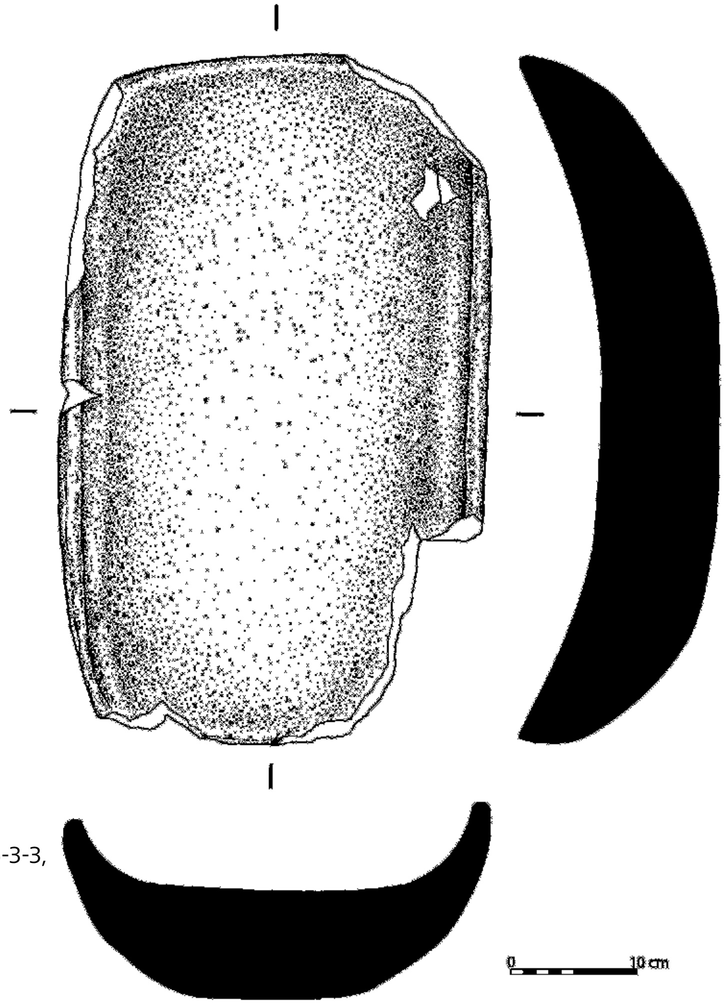


FIGURE 5.24. Deep basin limestone metate from Structure M7-34. 21A16-3-3, Cat. 296-1, WMT 21A-1. (⅙ scale)

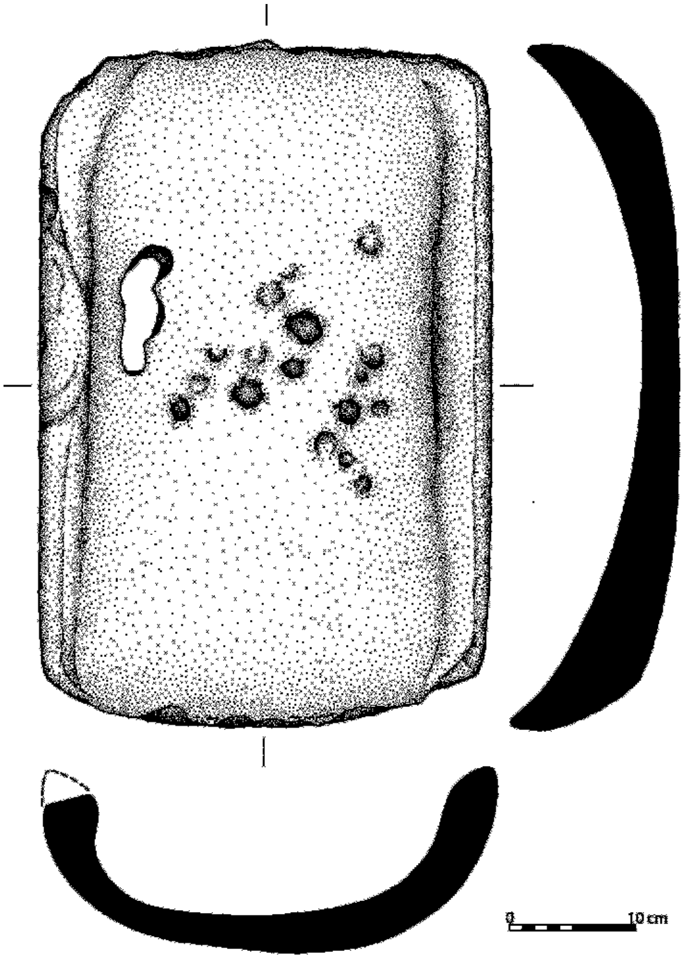


Figure 5.25. Deep basin limestone metate from Structure M7-34. 21A30-2-4, Cat. 658-1, WMT 21A-4. (⅙ scale)

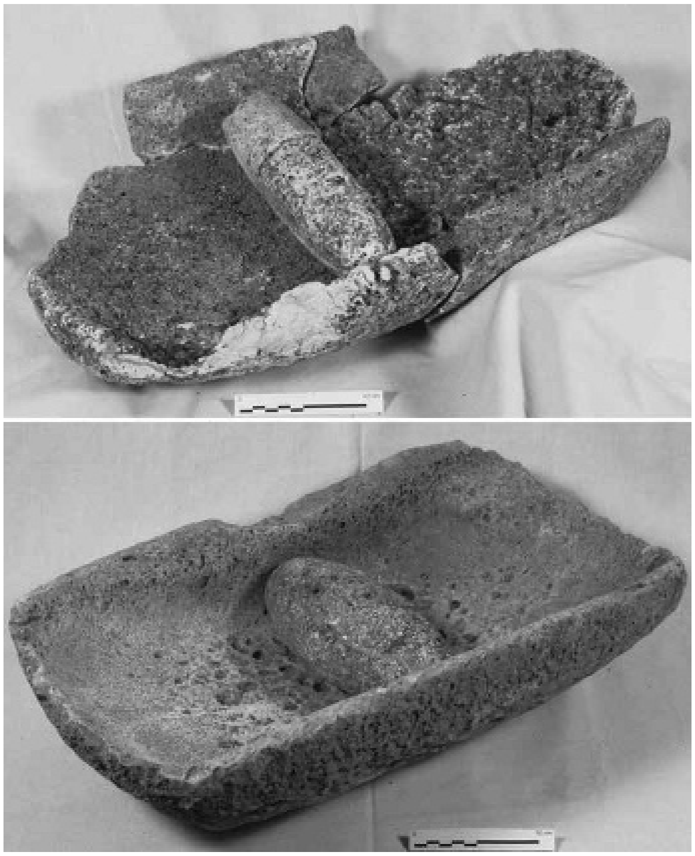


Figure 5.26. Metates and matching manos from Structure M7-34. (⅙ scale) Top: Deep basin limestone metate, 21A16-3-3, Cat. 296-1, WMT 21A-1. Mano: 21A42-3-1, Cat. 684-1, WMN 21A-4. Bottom: Deep basin limestone metate, 21A30-2-4, Cat. 658-1, WMT 21A-4. Mano from Structure M8-4, 23A42-3-2, Cat. 1932-1, WMN 23A-8.

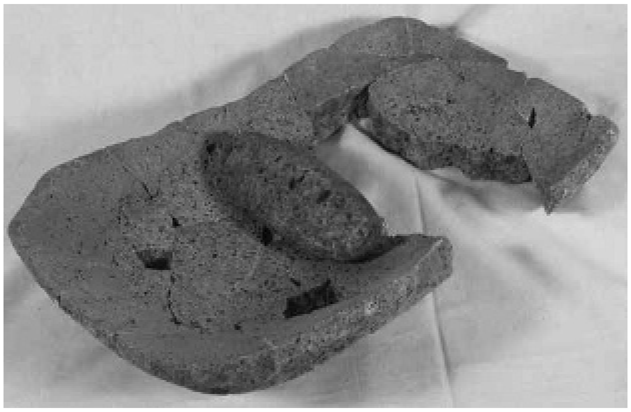


Figure 5.27. Shallow basin quartzite metate from Structure M7-91 and matching mano from Structure M8-4. Metate: 21A82-3-2, Cat. 1030-1, WMT 21A-10. Mano: 23A43-3-3, Cat. 1862-1, WMN 23A-10. (⅙ scale)

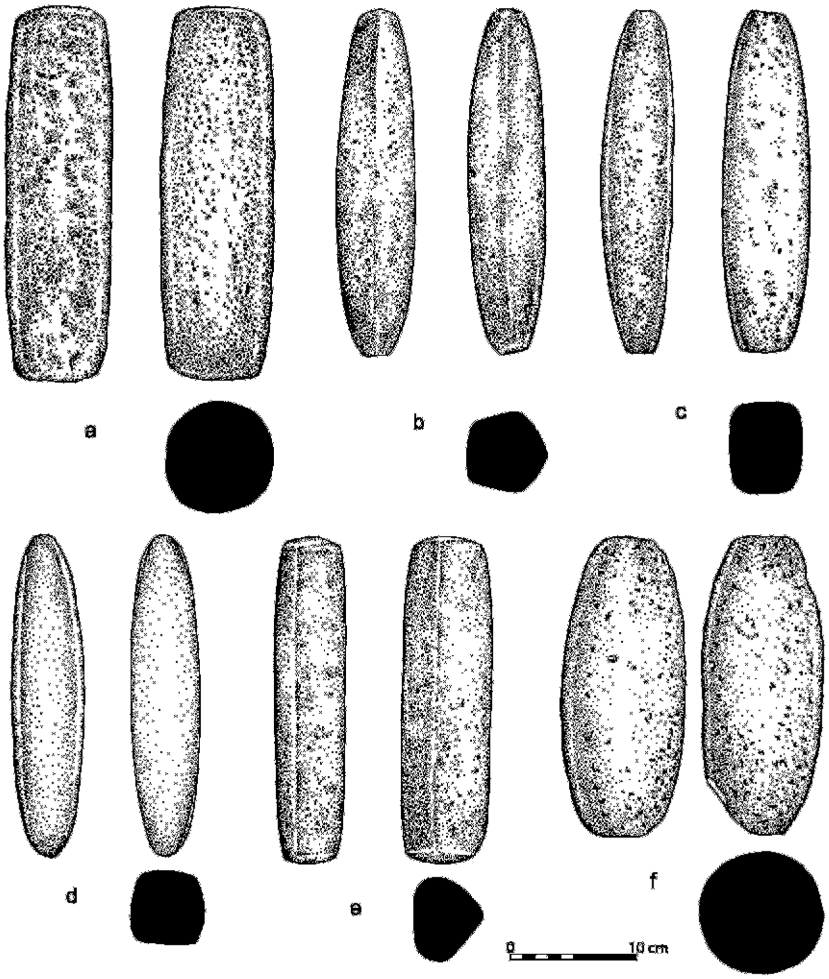


FIGURE 5.28. Limestone manos from Structure M8-4 (23A42-3-2). (⅙ scale) (a) Square, lenticular, Cat. 1710-1, WMN 23A-1. (b) Pentagonal, lenticular, Cat. 1926-1, WMN 23A-2. (c) Rectangular, lenticular, Cat. 1928-1, WMN 23A-4. (d) Parallelogram, symmetrical elliptical, Cat. 1930-1, WMN 23A-6. (e) Asymmetrical quadrangular, rectangular, Cat. 1931-1, WMN 23A-7. (f) Round, lenticular, Cat. 1932-1, WMN 23A-8.

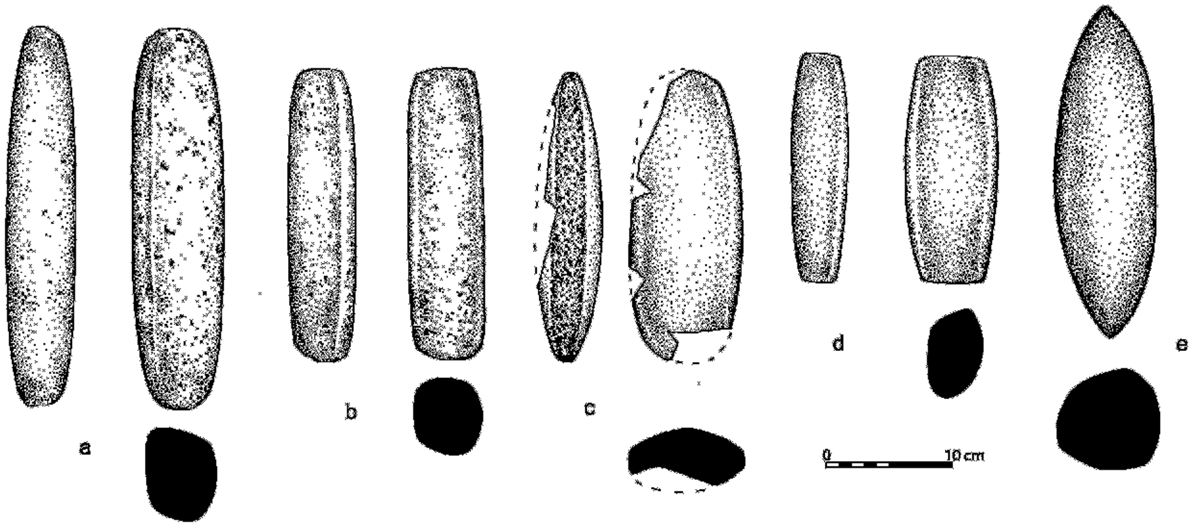


FIGURE 5.29. Limestone manos. (⅙ scale) (a) Parallelogram, oval, 23A42-3-2, Cat. 1929-1, WMN 23A-5. (b) Asymmetrical quadrangular, lenticular, 23A42-3-2, Cat. 1933-1, WMN 23A-9. (c) Lenticular, lenticular, 20A5-3-1, Cat. 292-1, WMN 20A-15. (d) Asymmetrical oval, lenticular, 14B1-3-4, Cat. 558-1, WMN 14B-1. (e) Round, symmetrical elliptical, 14B3-3-2, Cat. 527-1, WMN 14B-2.

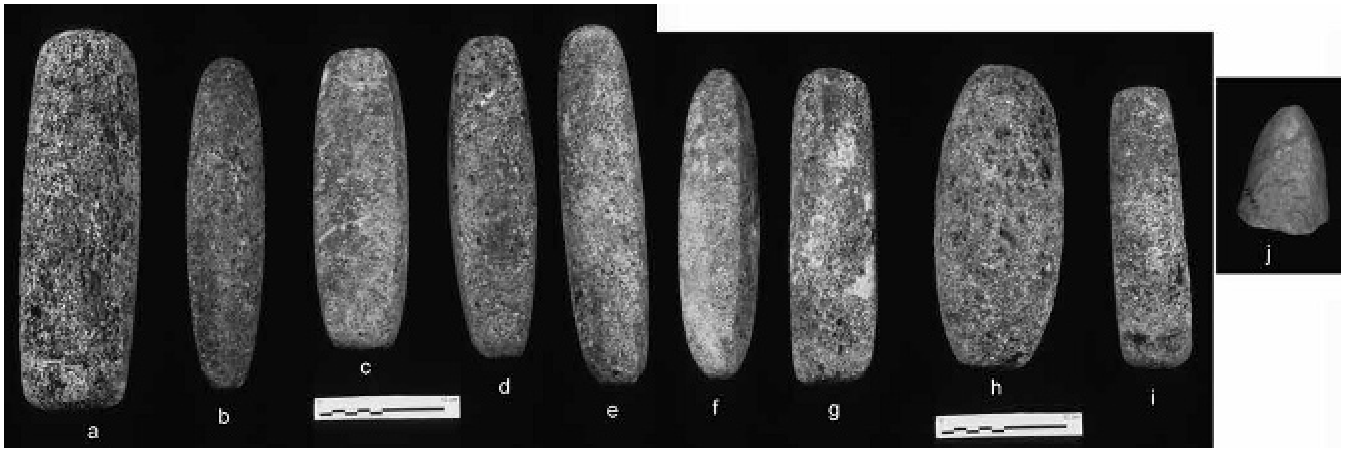


Figure 5.30. Limestone manos. (a–i) Structure M8-4 (23A42-3-2). (⅙ scale) (a) Cat. 1710-1, WMN 23A-1. (b) Cat. 1926-1, WMN 23A-2. (c) Asymmetrical quadrangular, lenticular, Cat. 1927-1, WMN 23A-3. (d) Cat. 1928-1, WMN 23A-4. (e) 1929-1, WMN 23A-5. (f) Cat. 1930-1, WMN 23A-6. (g) Cat. 1931-1, WMN 23A-7. (h) Cat. 1932-1, WMN 23A-8. (i) Cat. 1933-1, WMN 23A-9. (j) Possible preform from Structure M7-32, symmetrical elliptical, symmetrical elliptical, 22B43-2-1, Cat. 367-1.

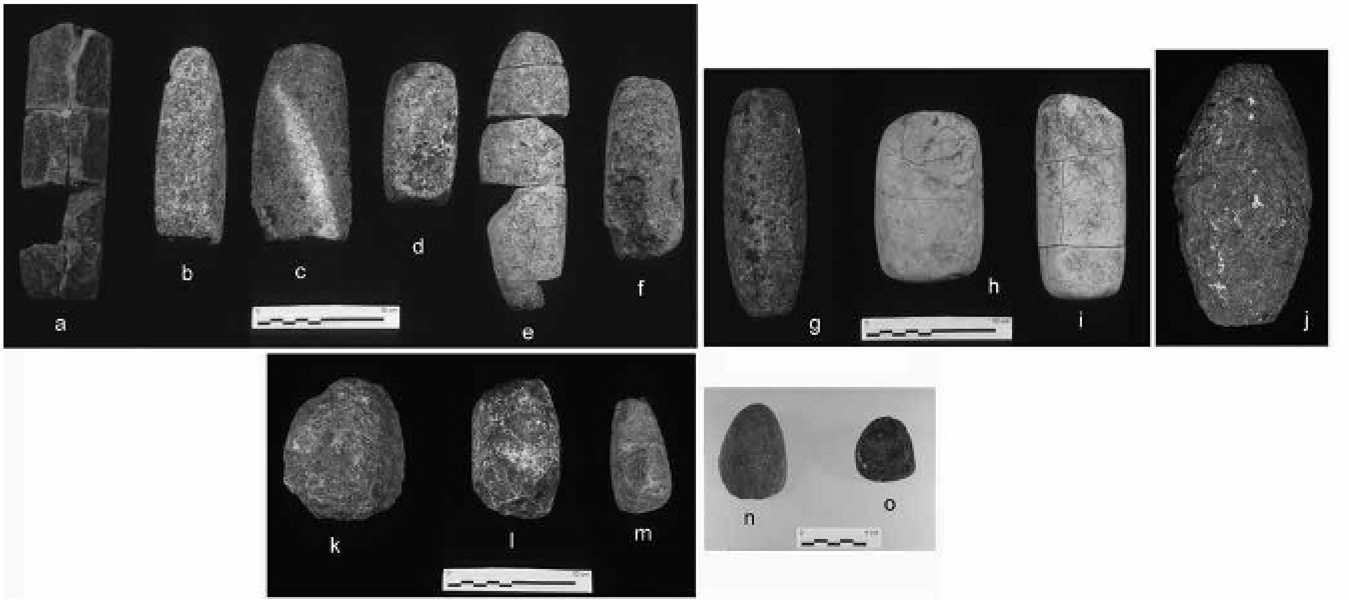


Figure 5.31. Manos from Structure M8-4 (limestone unless otherwise noted). (⅙ scale) (a) Sandstone, round, rectangular, 23A12-3-2, Cat. 577-1, WMN 23A-14. (b) Asymmetrical quadrangular, lenticular, 23A37-3-1, Cat. 1572-1, WMN 23A-17. (c) Asymmetrical elliptical, symmetrical elliptical, 23A38-3-4, Cat. 1721-1, WMN 23A-16. (d) Square, lenticular, 23A38-3-4, Cat. 1718-1, WMN 23A-13. (e) Square, lenticular, 23A40-3-3, Cat. 1239-1, WMN 23A-12. (f) Square, lenticular, 23A20-3-1, Cat. 1328-1, WMN 23A-18. (g) Quartzite, asymmetrical quadrangular, lenticular, 23A43-3-3, Cat. 1862-1, WMN 23A-10. (h) Rectangular, rectangular, 23A18-3-4, Cat. 1206-1, WMN 23A-11. (i) Rectangular, rectangular, 23A6-3-4, Cat. 447-1, WMN 23A-15. (j) Possible preform, 23A3-3-3, Cat. 980-1. (k–o). Reused manos with possible end use. (k) Round, oval, 23A46-3-1, Cat. 2071-1, WMN 23A-20. (l) Square, undetermined, 23A22-3-2, Cat. 1785-1, WMN 23A-19. (m) Square, lenticular, 23A13-2-1, Cat. 1141-1, WMN 23A-21. (n) Quartzite, asymmetrical oval, oval, 23A21-3-2, Cat. 1952-1, WMN 23A-22. (o) Square, undetermined, 23A34-3-4, Cat. 1033-1, WMN 23A-23.

Table 5.3. End Use of Manos.

Condition	Reuse	Total	End use	No end use	Undetermined
Complete or almost complete		64	6	55	3
Broken	Reused	36	17	14	5
	Not reused	157	1	135	21
	Undetermined	15		12	3
	Subtotal	208	18	161	29
Total		272	24	216	32

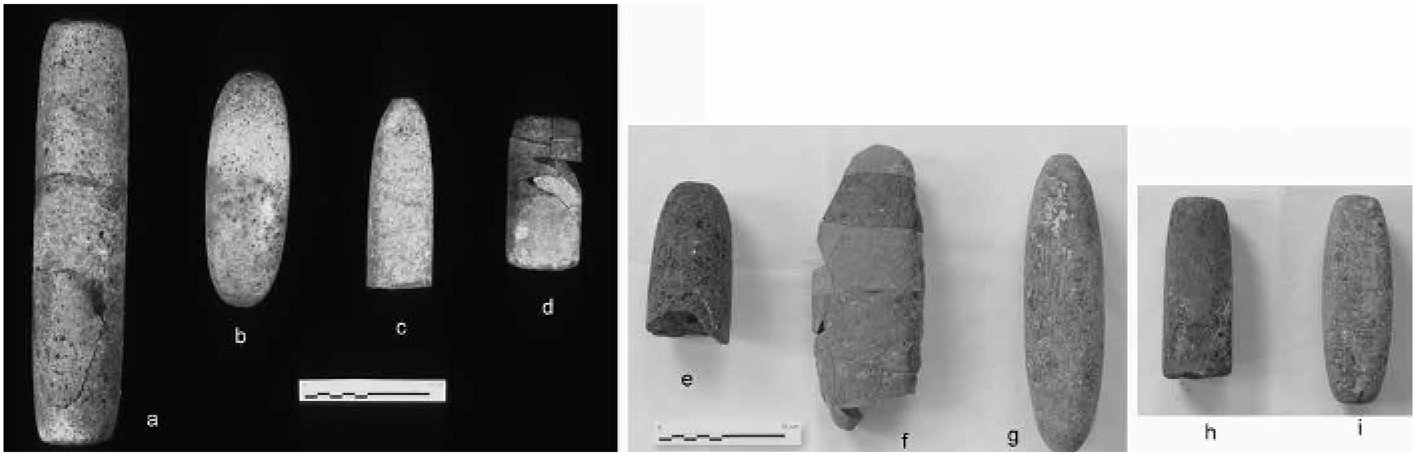


Figure 5.32. Manos from Structure M8-8 (limestone unless otherwise noted). (⅙ scale) (a) Wedge shape, lenticular, 20A31-3-2, Cat. 1666-1, WMN 20A-17. (b) Quartzite, asymmetrical quadrangular, oval, 20A31-3-4, Cat. 1670-1, WMN 20A-20. (c) Square, lenticular, 20A31-3-2, Cat. 1664-1. (d) Symmetrical oval, rectangular, 20A31-3-2, Cat. 1668-1, WMN 20A-19. (e) Round, oval, 20A5-3-4, Cat. 301-1. (f) Lenticular, lenticular, 20A5-3-1, Cat. 292-1, WMN 20A-15. (g) Square, oval, 20A5-3-3, Cat. 296-1, WMN 20A-12. (h) Square, lenticular, 20A13-3-4, Cat. 618-1. (i) Square, lenticular, 20A14-2-1, Cat. 179-1, WMN 20A-11.

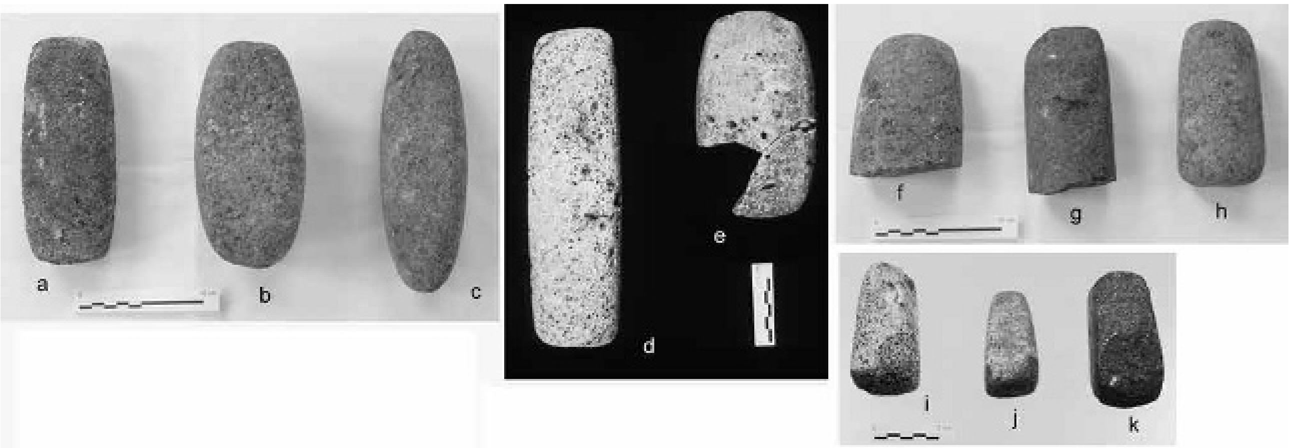


Figure 5.33. Manos from Structure M8-8 (limestone unless otherwise noted). (⅙ scale) (a) Sandstone, lenticular, lenticular, 20A16-3-1, Cat. 710-1, WMN 20A-10. (b) Parallelogram, lenticular, 20A17-3-4, Cat. 729-1, WMN 20A-4. (c) Square, symmetrical elliptical, 20A17-3-4, Cat. 759-1, WMN 20A-7. (d) Square, lenticular, 20A33-3-3, Cat. 1640-1, WMN 20A-24. (e) Lenticular, lenticular, 20A33-3-1, Cat. 1637-1, WMN 20A-16. (f) Asymmetrical oval, asymmetrical elliptical, 20A6-2-2, Cat. 254-1, WMN 20A-6. (g) Sandstone, asymmetrical oval, rectangular, 20A17-2-2, Cat. 263-1, WMN 20A-5. (h) Quartzite, wedge shape, plano-convex, 20A17-2-2, Cat. 357-1, WMN 20A-8. (i–j) Reused manos with end use. (i) Square, lenticular, 20A41-2-1, Cat. 1390-1, WMN 20A-23. (j) Square, lenticular, 20A39-3-1, Cat. 1219-1, WMN 20A-22. (k) End use undetermined, igneous rock, square, asymmetrical rectangular, 20A32-3-3, Cat. 1652-1, WMN 20A-18.

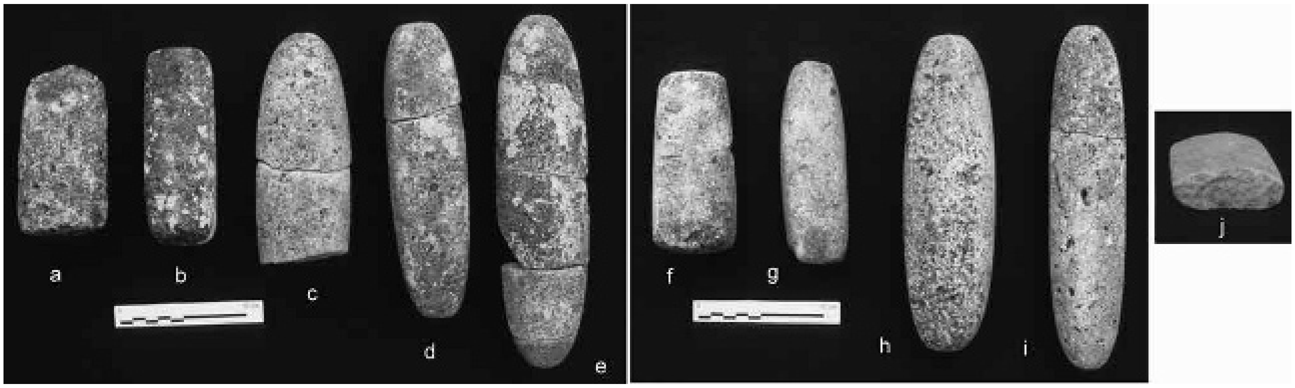


Figure 5.34. Limestone manos from Structures M8-13 and M8-10. (⅙ scale) (a–i) From Structure M8-13. (a) Symmetrical oval, lenticular, 14B20-3-1, Cat. 855-1, WMN 14B-8. (b) Square, rectangular, 14C4-3-4, Cat. 177-1, WMN 14B-1. (c) Round, oval, 14B19-3-3, Cat. 902-1, WMN 14B-6. (d) Round, symmetrical elliptical, 14B3-3-2, Cat. 527-1, WMN 14B-2. (e) Round, oval, 14B19-3-4, Cat. 841-1, WMN 14B-9. (f) Square, lenticular, 14B26-3-3, Cat. 873-1, WMN 14B-5. (g) Asymmetrical, lenticular, Cat. 919-2, WMN 14B-4. (h) Asymmetrical quadrangular, symmetrical elliptical, 14B26-3-3, Cat. 919-1, WMN 14B-3. (i) Pentagonal, oval, 14B30-1-1, Cat. 640-1, WMN 14B-7. (j) Heavily worn limestone mano from Structure M8-10. Lenticular, symmetrical elliptical, 14A5-4-1, Cat. 120-1.

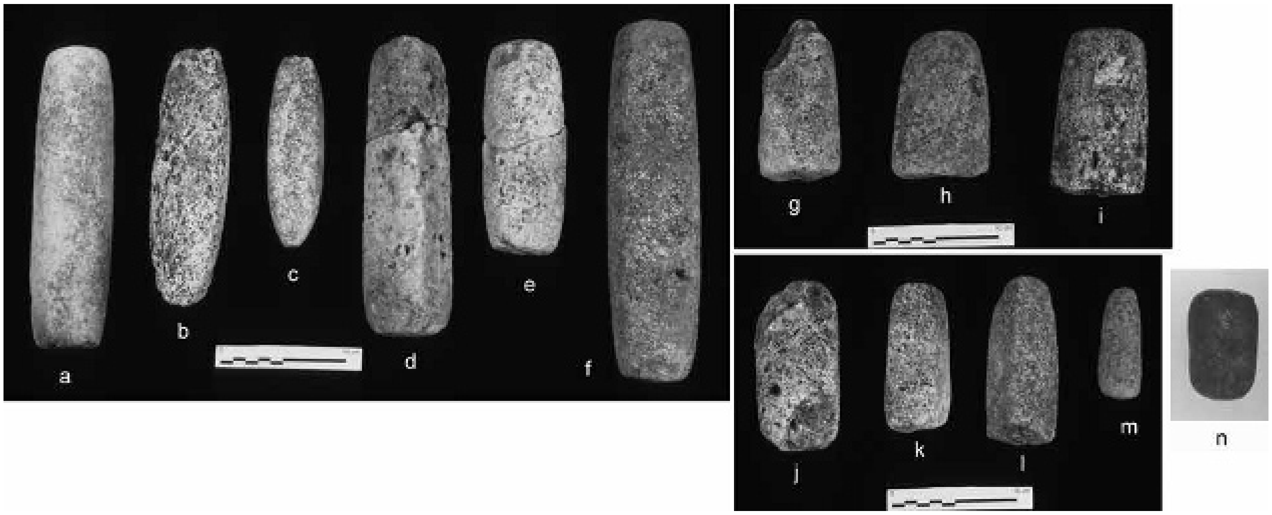


Figure 5.35. Manos from Structures M8-2 and M8-3. (⅙ scale) (a–l) Limestone. (a) Pentagonal, lenticular, 23B15-3-4, Cat. 311-1, WMN 23B-1. (b) Asymmetrical quadrangular, lenticular, 23B5-3-2, Cat. 570-1, WMN 23B-2. (c) Square, symmetrical elliptical, 23B5-3-2, Cat. 571, WMN 23B-3. (d) Flat triangular, rectangular, 23B17-3-1, Cat. 604-1, WMN 23B-4. (e) Square, lenticular, 23B17-3-4, Cat. 608-1, WMN 23B-5. (f) Asymmetrical quadrangular, lenticular, 23B20-3-2, Cat. 516-1, WMN 23B-6. (g–n) Reused manos. (g) With end use, asymmetrical quadrangular, undetermined, 23B5-3-2, Cat. 572-1, WMN 23B-9. (h) No end use, rectangular, lenticular, 23B24-3-3, Cat. 627-1, WMN 23B-14. (i) No end use, pentagonal, lenticular, 23B22-3-1, Cat. 624-1, WMN 23B-13. (j) With end use, square, rectangular, 23B7-3-4, Cat. 435-1, WMN 23B-7. (k) No end use, asymmetrical quadrangular, lenticular, 23B17-3-4, Cat. 607-1, WMN 23B-11. (l) End use undetermined, asymmetrical quadrangular, lenticular, 23B5-3-2, Cat. 569-1, WMN 23B-10. (m) Sandstone, with end use, square, lenticular, 23B19-3-1, Cat. 480-1, WMN 23B-8. (n) Sandstone, asymmetrical quadrangular, rectangular, 23B18-3-2, Cat. 639-1, WMN 23B-12.

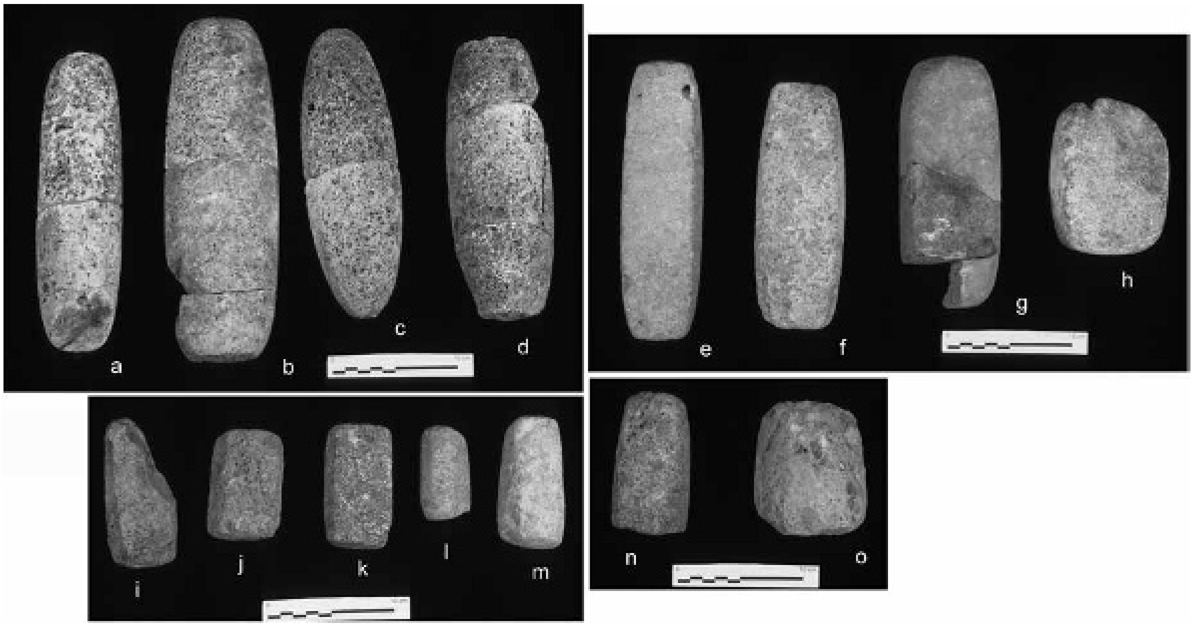


Figure 5.36. Manos from Structure M7-34. (⅙ scale) (a–h) Limestone. (a) Parallelogram, oval, 21A42-3-1, Cat. 684-1, WMN 21A-4. (b) Round, lenticular, 21A51-3-1, Cat. 803-1, WMN 21A-5. (c) Square, oval, 21A21-3-1, Cat. 340-1, WMN 21A-7. (d) Round, lenticular, 21A20-3-3, Cat. 344-1, WMN 21A-8. (e) Rectangular, lenticular, 21A3-3-1, Cat. 416-1, WMN 21A-1. (f) Lenticular, lenticular, 21A3-3-1, Cat. 418-1, WMN 21A-2. (g) Rectangular, rectangular, 21A35-3-3, Cat. 815-1, WMN 21A-6. (h) Rectangular, asymmetrical rectangular, 21A34-2-2, Cat. 434-1, WMN 21A-3. (i–m) Reused limestone manos. (i) With end use, square, rectangular, 21A22-2-2, Cat. 436-1, WMN 21A-9. (j) No end use, rhomboidal, rectangular, 21A33-3-1, Cat. 664-1, WMN 21A-10. (k) With end use, rhomboidal, rectangular, 21A33-3-2, Cat. 670-1, WMN 21A-11. (l) End use undetermined, symmetrical triangular, asymmetrical rectangular, 21A34-3-1, Cat. 676-1, WMN 21A-12. (m) With end use, square, asymmetrical rectangular, 21A44-2-1, Cat. 756-1, WMN 21A-13. (n–o) Quartzite. (n) Symmetrical oval, lenticular, 21A49-3-2, Cat. 792-1, WMN 21A-14. (o) Asymmetrical elliptical, rectangular, 21A65-3-3, Cat. 1175-1, WMN 21A-15.

TABLE 5.4. Distribution of Metates and Manos.

		METATES						MANOS				
SUBOPERATION	STRUCTURE/ AREA	TOTAL	LIMESTONE	SANDSTONE	QUARTZITE	CONGLOMERATE	IGNEOUS ROCK	TOTAL	LIMESTONE	SANDSTONE	QUARTZITE	IGNEOUS ROCK
22A	M7-22	26	17		1	1	7	29	26	1		2
	M7-25	3	2				1	3	3			
22B	M7-32	8	5		1		2	14	13			1
23A	M8-4	31	11	7	5		8	60	53	2	5	
	Patio	2	2					2	2			
20A	M8-8	20	10	2	2		6	38	29	2	4	3
14A	M8-10	4	2		2			7	7			
14B&C	M8-13	5	5					22	19	1	1	1
	Patio	5	3		2			3	3			
23B	M8-2	6	4		2			14	13	1		
	M8-3	1			1			7	6	1		
21A	M7-34	23	18		4		1	59	54	1	1	3
	M7-91	6	4		2			6	6			
	M7-92	5	4		1			4	4			
	Other	6	6					2	1		1	
24	Barranca Escondida	1	1									
27	K8-27							2	2			

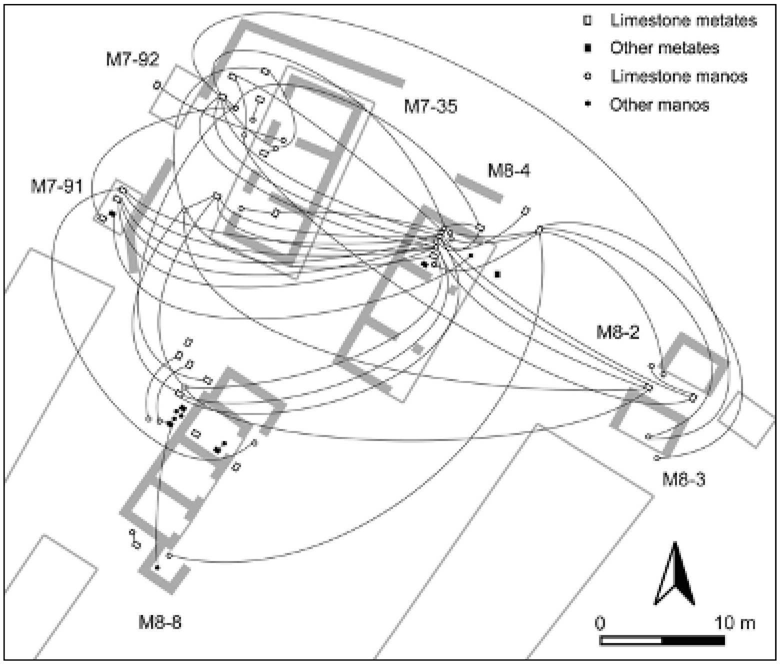


FIGURE 5.37. Map showing the approximate locations of matching metates and manos in Structures M7-35, M7-91, M7-92, M8-2, M8-3, M8-4, and M8-8. The sizes of metates and manos are not to scale.

manos were probably used for the preparation of corn. Flat metates made of igneous rock tend to be smaller, and they may have been used mainly for grinding other materials in smaller quantities. Sandstone metates and manos do not appear to have been suited for the preparation of food, as their sand particles easily come off during use. As we see later, these interpretations are supported by the distribution of these implements: limestone metates were often found in the same areas as storage and cooking vessels. Although many metates and manos may have been used for more than one kind of material, these general correlations between their types and use help us to examine the kinds of activities and the use of space in the excavated areas.

The high ratio of limestone pieces in the Aguateca metate and mano collection is notable (62 percent of metates and 89 percent of manos). At Ceibal (Seibal), located near Aguateca, Willey (1978:59) found that 10 out of 65 mineralogically identifiable metates were made of limestone, with quartzite and conglomerate being the most common materials. Moholy-Nagy (2003a:38) states that at Tikal about two-thirds of manos were made of quartzite and 12 percent were made of limestone. It is probable that the Classic Maya preferred implements made of hard stone for grinding corn, just as most modern farmers of the region do, but those nonlocal materials must have been harder to obtain than the locally abundant limestone. The high percentage of limestone objects in the Aguateca elite residential area probably reflects weak access to these imported goods by the residents of this center or the breakdown of long-distance trade at the end of the Late Classic period, to which most Aguateca items date. The possible use of limestone manos with quartzite or igneous rock metates discussed above may have been caused by a limited availability of imported materials at Aguateca. Spink (1983:152) notes that modern farmers prefer to use a mano and a metate made of the same material so they wear down at the same rate. The residents of Aguateca may have sometimes substituted locally available limestone manos for difficult-to-obtain hard rock tools.

Although some manos were placed with metates, many were stored separately. If we can determine which manos were used with which metates, the locations of storage would help us to study patterns of interactions between the residents of different buildings. For this purpose, I examined the degree of fit by placing manos on metates (Tables 5.5 and 5.6, Figure 5.37). This study did not include metates and manos from Structure M8-13 (Operation 14), which were placed in a Guatemalan storage facility after the first season.

Theoretically, any mano that is substantially smaller and rounder than the transversal cross section of a metate could have been used with it. Likewise, longer manos

Table 5.5. Complete or Reconstructible Metates and Their Matching Manos.

WMT No.	Catalog No.	Lot	Structure	Room/Area	Type	Material	Matching manos
14B-1	360-1	14B14-2-2	M8-13	West room	Deep basin	Limestone	WMN 14B-2
14B-2	552-1	14B1-3-4	M8-13	West room	Shallow basin	Limestone	WMN 14B-1
20A-1	943-1	20A20-3-3	M8-8	North room	Shallow basin	Limestone	
20A-2	797-1	20A15-3-4	M8-8	Back	Deep basin	Limestone	WMN 20A-4
20A-3	988-1	20A15-3-4	M8-8	Back	Deep basin	Limestone	WMN 20A-7
20A-4	985-1	20A15-3-4	M8-8	Back	Deep basin	Limestone	
20A-5	794-1	20A14-3-3	M8-8	Back	Deep basin	Limestone	WMN 21A-5
20A-6	860-1	20A19-3-1	M8-8	North room	Flat	Sandstone	WMN 20A-1
20A-7	771-1	20A6-3-3	M8-8	Back	Flat	Sandstone	WMN 20A-5, WMN 20A-8
20A-8	764-1	20A6-3-3	M8-8	Back	Deep basin	Quartzite	WMN 20A-2, WMN 20A-20, WMN 20A-7
20A-9	851-1	20A6-3-3	M8-8	Back	Shallow basin	Limestone	WMN 20A-3, WMN 21A-4, WMN 23A-3, WMN 23A-6
20A-10	894-1	20A18-3-1	M8-8	North room	Shallow basin	Limestone	
20A-11	1314-1	20A32-2-1	M8-8	South side	Flat	Limestone	WMN 20A-21
21A-1	296-1	21A16-3-3	M7-34	North room	Deep basin	Limestone	WMN 21A-1, WMN 21A-4
21A-2	312-1	21A8-3-4	M7-34	North room	Shallow basin	Limestone	WMN 21A-8
21A-3	613-1	21A13-3-4	M7-34	Center room	Flat	Limestone	WMN 21A-1
21A-4	658-1	21A30-2-4	M7-34	South room	Deep basin	Limestone	WMN 21A-3, WMN 23A-8
21A-5	672-1	21A33-3-2	M7-34	South room	Shallow basin	Limestone	WMN 21A-4, WMN 23A-3, WMN 23A-6, WMN 20A-3
21A-6	795-1	21A50-3-1	M7-34	Front	Deep basin	Limestone	WMN 21A-7, WMN 23A-8
21A-7	799-1	21A51-3-1	M7-34	Front	Shallow basin	Limestone	WMN 21A-1, WMN 21A-5, WMN 23A-2, WMN 23A-3, WMN 23A-4, WMN 23A-6, WMN 23B-1, WMN 20A-3
21A-8	1018-1	21A82-3-2	M7-91		Shallow basin	Limestone	WMN 23A-3, WMN 23A-4, WMN 23A-6
21A-9	1021-1	21A82-3-4	M7-91		Flat	Limestone	WMN 21A-5
21A-10	1030-1	21A82-3-2	M7-91		Shallow basin	Quartzite	WMN 23A-10
21A-11	1051-1	21A79-3-4	M7-91		Shallow basin	Limestone	WMN 23A-3, WMN 23A-6, WMN 20A-15
21A-12	1123-1	21A69-3-3	M7-92		Shallow basin	Limestone	WMN 21A-2
23A-1	1713-1	23A32-3-1	M8-4	North addition	Shallow basin	Limestone	WMN 23A-2, WMN 23A-4, WMN 21A-5
23A-2	2062-1	23A42-3-2	M8-4	North room	Shallow basin	Limestone	WMN 23A-3, WMN 21A-4, WMN 20A-3
23A-3	1247-1	23A40-3-1	M8-4	North addition	Shallow basin	Limestone	WMN 23A-6
23A-4	1237-1	23A40-3-4	M8-4	North addition	Flat	Limestone	WMN 23A-1, WMN 23A-7, WMN 23A-9, WMN 23B-1, WMN 23B-4, WMN 23B-6, WMN 20A-17
23A-5	1965-1	23A42-3-4	M8-4	North room	Flat	Sandstone	
23A-6	990-1	23A45-3-3	M8-4	North room	Flat	Igneous rock	
23B-1	623-1	23B23-3-3	M8-2		Deep basin	Limestone	WMN 23B-2, WMN 21A-7, WMN 23A-8
23B-2	357-1	23B5-3-3	M8-2		Shallow basin	Limestone	WMN 23A-3, WMN 21A-4, WMN 20A-3, WMN 23A-6

Note: WMT 14B-1 and 14B-2 from Structure M8-13 were not checked against manos from other structures.

Table 5.6. Complete or Reused Manos with Their Matching Metates.

WMN No.	Catalog No.	Lot	Structure	Room/Area	Original length (cm)	Complete/ reused	Material	Matching metates
14B-1	558-1	14B1-3-4	M8-13	West room	18	complete	Limestone	WMT 14B-2
14B-2	527-1	14B3-3-2	M8-13	West room	26.3	complete	Limestone	WMT 14B-1
14B-3	919-1	14B26-3-3	M8-13	Back	24.4	complete	Limestone	
14B-4	919-2	14B26-3-3	M8-13	Back	15.8	complete	Limestone	
14B-5	873-1	14B26-3-3	M8-13	Back		reused	Limestone	
14B-6	902-1	14B19-3-3	M8-13	Center room	24	complete	Limestone	
14B-7	640-1	14B30-1-1	M8-13	East room	26.6	complete	Limestone	
14B-8	855-1	14B20-3-1	M8-13	Center room		reused	Limestone	
14B-9	843-1	14B19-3-4	M8-13	Center room	27.2	complete	Limestone	
14B-10	177-1	14C4-3-4			14.9	complete	Limestone	
14B-11	196-1	14C6-3-3			22	complete	Limestone	
20A-1	867-1	20A19-3-1	M8-8	North room	24	complete	Sandstone	WMT 20A-6
20A-2	733-1	20A6-3-3	M8-8	Back	20	reused	Quartzite	WMT 20A-8
20A-3	801-1	20A6-3-3	M8-8	Back	23.8	complete	Limestone	WMT 20A-9, WMT 21A-5, WMT 21A-7, WMT 23A-2, WMT 23B-2
20A-4	729-1	20A17-3-4	M8-8	Back	17.4	complete	Limestone	WMT 20A-2
20A-5	263-1	20A17-2-2	M8-8	North room		complete	Sandstone	WMT 20A-7
20A-7	759-1	20A17-3-4	M8-8	Back	21.4	complete	Limestone	WMT 20A-3, WMT 20A-8
20A-8	357-1	20A17-2-2	M8-8	North room	21	reused	Quartzite	WMT 20A-7
20A-9	731-1	20A10-3-2	M8-8	Back		reused	Limestone	
20A-10	710-1	20A16-3-1	M8-8	Back	18.3	complete	Limestone	
20A-11	179-1	20A14-2-1	M8-8	North addition	16.2	complete	Limestone	
20A-12	296-1	20A5-3-3	M8-8	North room	24	complete	Limestone	
20A-15	292-1	20A5-3-1	M8-8	North room	23	complete	Limestone	WMT 21A-11
20A-16	1637-1	20A33-3-1	M8-8	South side	15.7	complete	Limestone	
20A-17	1666-1	20A31-3-2	M8-8	South addition	33.7	complete	Limestone	WMT 23A-4
20A-18	1652-1	20A32-3-3	M8-8	South side	11.1	complete	Igneous rock	
20A-19	1668-1	20A31-3-2	M8-8	South addition	12.5	complete	Limestone	
20A-20	1670-1	20A31-3-4	M8-8	South addition	18.5	complete	Quartzite	WMT 20A-8
20A-21	1648-1	20A32-3-1	M8-8	South side	13.1	complete	Limestone	WMT 20A-11
20A-22	1219-1	20A39-3-1	M8-8	Back		reused	Limestone	
20A-23	1390-1	20A41-2-1	M8-8	North addition		reused	Limestone	
20A-24	1640-1	20A33-3-3	M8-8	South side	24.5	complete	Limestone	
21A-1	416-1	21A3-3-1	M7-34	Center room	22.7	complete	Limestone	WMT 21A-1, WMT 21A-3, WMT 21A-7
21A-2	418-1	21A3-3-1	M7-34	Center room	19.8	complete	Limestone	WMT 21A-12
21A-3	434-1	21A34-2-2	M7-34	South room	12.4	complete	Limestone	WMT 21A-4
21A-4	684-1	21A42-3-1	M7-34	South room	25.1	complete	Limestone	WMT 21A-1, WMT 21A-5, WMT 20A-9, WMT 23A-2, WMT 23B-2
21A-5	803-1	21A51-3-1	M7-34	Front	28.5	complete	Limestone	WMT 21A-7, WMT 21A-9, WMT 20A-1, WMT 20A-5, WMT 23A-1
21A-6	815-1	21A35-3-3	M7-34	South room	20.3	complete	Limestone	
21A-7	340-1	21A21-3-1	M7-34	Center room	24.8	complete	Limestone	WMT 21A-6, WMT 23B-1
21A-8	344-1	21A20-3-3	M7-34	Center room	23.3	complete	Limestone	WMT 21A-2
21A-9	436-1	21A22-2-2	M7-34	Center room		reused	Limestone	
21A-10	664-1	21A33-3-1	M7-34	South room		reused	Limestone	
21A-11	670-1	21A33-3-2	M7-34	South room		reused	Limestone	

Table 5.6. (cont'd.) Complete or Reused Manos with Their Matching Metates.

WMN No.	Catalog No.	Lot	Structure	Room/Area	Original length (cm)	Complete/ reused	Material	Matching metates
21A-12	676-1	21A34-3-1	M7-34	South room		reused	Limestone	
21A-13	756-1	21A44-2-1	M7-34	South side		reused	Limestone	
21A-14	792-1	21A49-3-2	M7-34	Front		reused	Quartzite	
21A-15	1175-1	21A65-3-3		Causeway terrace		reused	Quartzite	
23A-1	1710-1	23A42-3-2	M8-4	North room	30.1	complete	Limestone	WMT 23A-4
23A-2	1926-1	23A42-3-2	M8-4	North room	27.3	complete	Limestone	WMT 23A-1, WMT 21A-7
23A-3	1927-1	23A42-3-2	M8-4	North room	25.2	complete	Limestone	WMT 23A-2, WMT 21A-5, WMT 21A-7, WMT 21A-8, WMT 21A-11, WMT 20A-9, WMT 23B-2
23A-4	1928-1	23A42-3-2	M8-4	North room	27.2	complete	Limestone	WMT 21A-7, WMT 21A-8, WMT 23A-1
23A-5	1929-1	23A42-3-2	M8-4	North room	30.2	complete	Limestone	
23A-6	1930-1	23A42-3-2	M8-4	North room	26.1	complete	Limestone	WMT 23A-3, WMT 20A-9, WMT 21-5, WMT 21A-7, WMT 21A-8, WMT 21A-11, WMT 23B-2
23A-7	1931-1	23A42-3-2	M8-4	North room	26.1	complete	Limestone	WMT 23A-4
23A-8	1932-1	23A42-3-2	M8-4	North room	23.8	complete	Limestone	WMT 21A-4, WMT 21A-6, WMT 23B-1
23A-9	1933-1	23A42-3-2	M8-4	North room	23	complete	Limestone	WMT 23A-4
23A-10	1862-1	23A43-3-3	M8-4	North room	17.2	complete	Quartzite	WMT 21A-10
23A-11	1206-1	23A18-3-4	M8-4	North room	12.9	complete	Limestone	
23A-12	1239-1	23A40-3-3	M8-4	North addition	22.9	complete	Limestone	
23A-13	1718-1	23A38-3-4	M8-4	North addition		complete	Limestone	
23A-14	577-1	23A12-3-2	M8-4	Center room		complete	Sandstone	
23A-15	447-1	23A6-3-4	M8-4	South room	15.5	complete	Limestone	
23A-16	1721-1	23A38-3-4	M8-4	North addition	26	reused	Limestone	
23A-17	1572-1	23A37-3-1	M8-4	North addition	22	reused	Limestone	
23A-18	1328-1	23A20-3-1	M8-4	North room	26	reused	Limestone	
23A-19	1785-1	23A22-3-2	M8-4	North addition		reused	Limestone	
23A-20	2071-1	23A46-3-1	M8-4	Center room		reused	Limestone	
23A-21	1141-1	23A13-2-1	M8-4	Center room		reused	Limestone	
23A-22	1952-1	23A21-3-2	M8-4	North addition		reused	Quartzite	
23A-23	1033-1	23A34-3-4	M8-4	Center room		reused	Limestone	
23B-1	311-1	23B15-3-4	M8-3	M8-3	24.2	complete	Limestone	WMT 21A-7, WMT 23A-4
23B-2	570-1	23B5-3-2	M8-2	M8-2	22	complete	Limestone	WMT 23B-1
23B-3	571-1	23B5-3-2	M8-2	M8-2	15.3	complete	Limestone	
23B-4	604-1	23B17-3-1	M8-2	M8-2	24.2	complete	Limestone	WMT 23A-4
23B-5	608-1	23B17-3-4	M8-2	M8-2	17.2	complete	Limestone	
23B-6	516-1	23B20-3-2	M8-3	M8-3	29	complete	Limestone	WMT 23A-4
23B-7	435-1	23B7-3-4	M8-3	M8-3		complete	Limestone	
23B-8	480-1	23B14-3-1	M8-3	M8-3		reused	Sandstone	
23B-9	572-1	23B5-3-2	M8-2	M8-2		reused	Limestone	
23B-10	569-1	23B5-3-2	M8-2	M8-2		reused	Limestone	
23B-11	607-1	23B17-3-4	M8-2	M8-2		reused	Limestone	
23B-12	639-1	23B18-3-2	M8-2	M8-2		reused	Sandstone	
23B-13	624-1	23B22-3-1	M8-2	M8-2		reused	Limestone	
23B-14	627-1	23B24-3-3	M8-2	M8-2		reused	Limestone	

Note: WMN 14B-1 through 11 from Structure M8-13 were not checked against metates from other structures. WMN numbers 20A-6, 13, and 14 were voided.

might have been used diagonally or parallel to the longer axis of a metate. Nonetheless, for manos and metates that were found together, transversal cross sections of the grinding surface of a metate were usually fairly consistent with the longitudinal cross section of the matching mano. This means that in most cases manos with curvature very close to the transversal cross section of a metate and with a length very close to the inner width of the metate were used in a right angle to the long axis of the metate. I identified those with a fairly good fit as matching metates and manos.

Still, their relations remain rather ambiguous. Tables 5.5 and 5.6 mainly comprise perfect or near perfect matches, but their distinctions from smaller yet still usable manos remain subjective. It appears that the lists include a significant number of combinations that were not used together. For example, when matching metates and manos are found together, as in the case of WMT 20A-9 and WMN 20A-3 placed behind Structure M8-8, it is likely that they were used as pairs most of the time rather than with the morphologically compatible implements located in other structures. The ambiguity is particularly notable for flat or shallow basin metates, probably because new metates and manos were often made in similar curvatures. Deep basin metates, in contrast, have a smaller range of compatibility because they were worn down along with their matching manos through continuous use together.

We can still gain important information about these implements from their distribution. Large limestone metates, located in food preparation areas of residences, often had matching manos nearby. Examples include WMT 14B-1 with WMN 14B-2, and WMT 14B-2 with WMN 14B-1, in the west room of Structure M8-13; WMT 20A-11 with WMN 20A-21 on the south side of Structure M8-8; and WMT 20A-9 with WMN 20A-3 behind Structure M8-8. They were most likely used together on a daily basis. These patterns contrast with those in smaller buildings: Structures M7-91, M7-92, M8-2, and M8-3. In Structure M7-91, excavators found four complete metates but no manos in usable condition, although some fragments may have been parts of complete objects or more manos may remain in unexcavated areas.

Eight manos found close together in a corner of the north room of Structure M8-4 (23A42-3-2) are significant in this regard (Volume 1:Figure 3.10). They are all relatively large and apparently fairly new. Although some of them fit the metates located nearby, good matches were found with those placed around Structures M7-91, M8-2, and M8-3. The manos were piled on the floor in a corner next to large storage jars. In other words, they were not easily accessible and appear to have been stored for special occasions, such as feasting and wartime emergencies. Only the heavier metates were left in their places of use. It is also suggestive that the quartzite mano found in this room fits the shallow basin quartzite metate placed in Structure M7-91. I should caution that a large part of the area behind Structure M8-4 was not excavated, and it is likely that there are more metates in this area, as in the case of Structures M8-8 and M8-10. Despite these ambiguities in the data, it is plausible that some pieces stored in the concentration of manos were meant to be used with the metates placed in Structure M7-91 and possibly those around Structures M8-2 and M8-3. This pattern may also argue for the nonresidential function of Structure M7-91. Nevertheless, 23 out of 56 complete or almost complete manos did not fit any of the excavated metates well. Again, there should be more metates in nearby unexcavated areas, and we also have to consider the possibility that some of them were meant to be used with metates placed in other unexcavated buildings.

The refitting of metate fragments provided another unique insight. Two fragments of a small shallow basin metate (Cat. 20A894-1, WMT 20A-10) were found on the bench of the north room of Structure M8-8 (20A18-3-1). A slightly smaller piece found on the northern side of Structure M8-4 (23A36-3-2) fit them, making a complete metate (Figure 5.14b). It is possible that after the metate broke, the residents of Structure M8-8 used half of it while the occupants of Structure M8-4 kept the other half. Alternatively, many objects found on the northern side and in the north addition of Structure M8-4, including this metate fragment, may have fallen from the Palace Group. In this case, it is possible that the residents of Structure M8-8 kept the larger half and discarded the smaller fragment. Later, during termination rituals, this piece and other trash may have been deposited in the Palace Group. We did not excavate the southern portion of the Palace Group, however, and we do not know if there were termination ritual deposits in this area.

DOUGHNUT STONES

Doughnut stones continue to be enigmatic objects. The study of these artifacts found during the Petexbatun Project led Inomata (1995:579) to favor the interpretation that they were grinding tools rather than digging stick weights or banner stones. It should be noted that the grinding surfaces would have been the interiors of the perforations since the exteriors are usually rough or can even have

TABLE 5.7. Doughnut Stones.

LOT	CATALOG NO.	WDS NO.	STRUCTURE	ROOM/AREA	CROSS SECTION	CONDITION	MATERIAL	COMMENT
22A15-3-1	348-1		M7-22	East room	round	broken	Limestone	
22A26-2-1	489-1		M7-25		round	broken	Limestone	
20A5-3-1	285-1	20A-1	M8-8	North room	round	complete	Limestone	
20A5-3-1	282-1	20A-2	M8-8	North room	round	almost complete	Limestone	
20A3-3-4	280-1	20A-3	M8-8	North room	round	complete	Limestone	
20A7-3-1	520-1	20A-4	M8-8	Center room	round	almost complete	Limestone	
20A40-3-2	1234-1	20A-5	M8-8	Back	square	complete	Limestone	
23A42-3-2	1711-1	23A-1	M8-4	North room	round	complete	Sandstone	
23A42-3-2	1712-1	23A-2	M8-4	North room	round	broken	Limestone	
23A42-3-2	1835-1	23A-3	M8-4	North room	round	broken	Limestone	
23A30-2-2	1172-1		M8-4	North addition	square	broken	Limestone	Perforation not finished
14B24-3-3	860-1	14B-1	M8-13	East room	thin	almost complete	Limestone	
14B26-3-1	872-1	14B-2	M8-13	Back	round	complete	Limestone	Hole not centered
14B28-3-4	832-1		M8-13	East room	thin	broken	Limestone	
23B5-3-1	567-1	23B-1	M8-2		round	complete	Limestone	
21A77-3-4	1066-1	21A-1	M7-34	Front	irregular	almost complete	Limestone	Hole not centered
21A19-2-2	1473-1		M7-34	Back	thin	broken	Sandstone	
21A21-3-1	339-1		M7-34	Center room	round	broken	Limestone	
21A68-3-4	1141-1		M7-92		round	broken	Limestone	
21A74-3-1	1070-1		M7-91		round	broken	Limestone	
21A75-3-2	1422-1			Causeway terrace	round	broken	Limestone	
21A77-3-4	1065-1		M7-34	Front	round	broken	Limestone	

carvings. At Cerén, Sheets (1992:96) found a doughnut stone with organic residue adhering to the interior of the perforation and suggested that it was used as a perforated mortar. The data from the Aguateca Project do not contradict this view (Table 5.7, Figures 5.38 and 5.39). All the excavated samples came from the Causeway area and the Palace Group. Particularly suggestive are three doughnut stones found with the concentration of manos in the north room of Structure M8-4 (23A42-3-2, WDS 23A-1, 2, and 3), pointing to their similarities in functions or use contexts. In a recent study, Tomasic (2012) proposes that some doughnut stones were used for thigh-supported spinning of fiber, and the floor assemblage distributions in the Aguateca residences show close associations between doughnut stones and spindle whorls. It is likely that doughnut stones were used for multiple purposes.

OTHER RELATED ARTIFACTS

The category of other limestone objects that were not parts of buildings can be divided into three classes: flat blocks, mano-like objects, and a disk-shaped artifact (Table 5.8, Figures 5.40–5.44). A large flat limestone block was found in the north addition of Structure M8-8 (20A43-3-4, Cat. 1632-1, Figures 5.40 and 5.41). In the field, we noticed that there were numerous fine incisions on the surface. In the lab, when I tried to brush off soils from the surface with my fingers, I suffered many small cuts. On closer examination, I noticed that there were numerous lithic particles in these incisions. They were most likely chipped-off pieces of cutting tools that were used on this surface. The block was probably used as a cutting table. In the field it was placed on small limestone blocks (Volume 1:Figure 3.26). A person could sit on the floor to work on this table. Incisions covered nearly the entire surface and went in various directions. In each of the smaller areas, however, incisions were placed in almost parallel positions in repetitions of similar strokes. They appear to have resulted from the cutting of thin objects, such as leather or bark, in delicate craft work rather than from butchering or cooking. The north addition was equipped with a drainage canal, and the work may have involved the use of water.

Seven other flat limestone blocks were found. Most of them have relatively smooth, but not completely flat, surfaces and do not seem to have been used for grinding. Only Cat. 20B527-1 has a smooth and flat surface, which may have resulted from grinding (Figure 5.43c). A mano-like stone, Cat. 23B310-2, was found in the proximity of a flat block, Cat. 23B310-1, and they appear to have been used

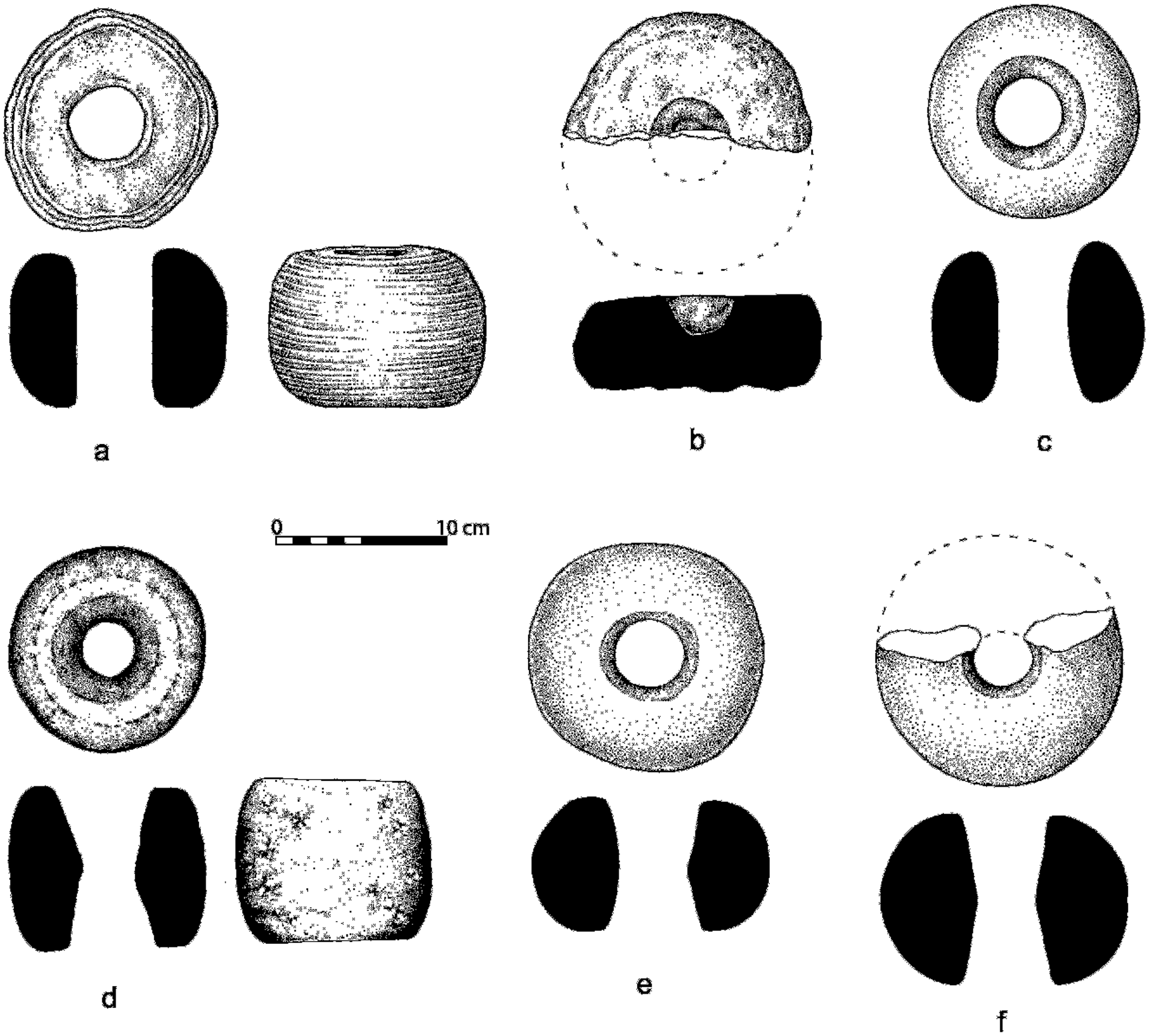


Figure 5.38. Limestone doughnut stones from Structures M8-4 and M8-8. (¼ scale) (a) 23A42-3-2, Cat. 1711-1, WDS 23A-1. (b) Unfinished doughnut stone, 23A30-2-2, Cat. 1172-1. WDS 23A-2. (c) 20A5-3-1, Cat. 285-1, WDS 20A-1. (d) 20A40-3-2, Cat. 1234-1, WDS 20A-5. (e) 20A3-3-4, Cat. 280-1, WDS 20A-3. (f) 20A7-3-1, Cat. 520-1, WDS 20A-4.

together (Figure 5.42c and d). Cat. 23B310-2's apparent bottom surface is not completely smooth, and it seems to have been used for pounding or pressing rather than grinding. Limestone objects Cat. 23B481-1 and 23B482-1, which were classified as stucco smoothers by Aoyama (Volume 2:48), were found near the flat blocks Cat. 23B312-1, 23B412-1, and 23B483-1 and may have been used together. Cat. 23B310-1 and 23B312-1 appear to have been burned severely and to have been broken from heat (Figure 5.42b and c). In sum, the functions of the flat limestone blocks remain unclear, except for Cat. 20A1632-1. Six of them were found in Structure M8-3, and they may be related to unique activities conducted in this building.

Seven limestone objects, including the aforementioned Cat. 23B310-2, have shapes similar to manos but do not exhibit the smooth grinding surfaces typical of manos. Cat. 14B951-1 and 14B636-1 may have been fragments of mano preforms (Figure 5.44a and b). Cat. 14B660-1 has a somewhat irregular shape with two small facets smoothed by grinding or polishing (Figure 5.44c). It may have served as a polishing stone for poles, sticks, or other objects of similar shape. The functions of the other mano-like stones are not clear. Cat. 14B849-1 has a round disk-like shape with a convex side and a flat side (Figure 5.44d). It is not clear whether it is a complete object or a broken one.

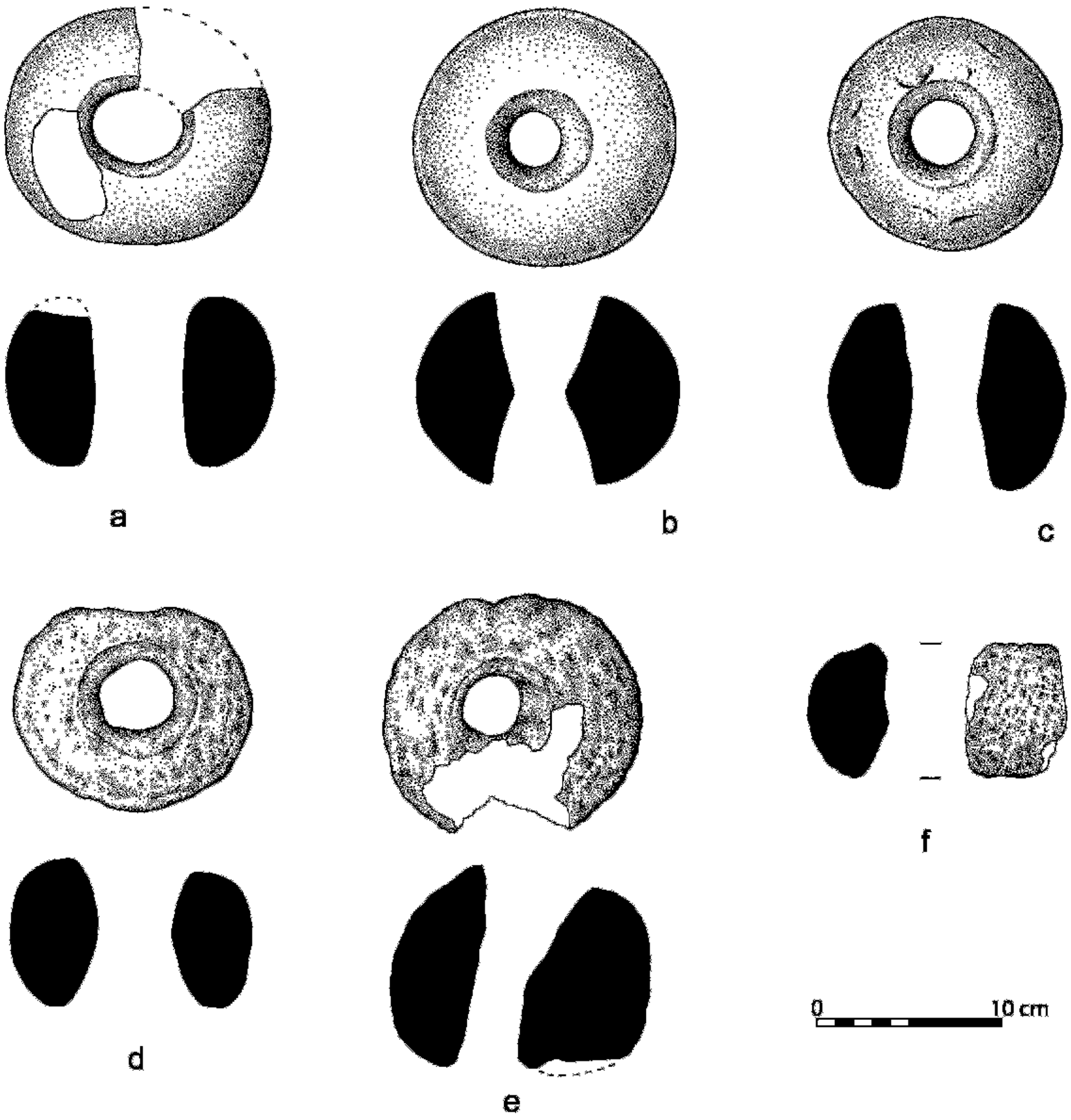


FIGURE 5.39. Limestone doughnut stones from Structures M8-8, M8-13, M8-2, M7-34, and M7-91. (¼ scale) (a) 20A5-3-1, Cat. 282-1, WDS 20A-2. (b) 14B26-3-1, Cat. 872-1, WDS 14B-2. (c) 14B24-3-3, Cat. 860-1, WDS 14B-1. (d) 23B5-3-1, Cat. 567-1, WDS 23B-1. (e) 21A77-3-4, Cat. 1277-1, WDS 21A-1. (f) 21A74-3-1, Cat. 1070-1.

Table 5.8. Miscellaneous Ground Stones.

Lot	Catalog No.	Structure	Room/Area	Form	Condition	Sample length (cm)	Material	Note
20A43-3-4	1632-1	M8-8	North addition	flat	complete	70.5	Limestone	Fine incisions on the top surface
23A30-3-2	2047-1	M8-4	North addition	flat	complete	60.2	Limestone	
23B14-3-1	312-1	M8-3		flat	complete	55.0	Limestone	
23B14-3-2	412-1	M8-3		flat	complete	93.7	Limestone	
23B14-3-2	483-1	M8-3		flat	complete	24.5	Limestone	
23B15-3-3	310-1	M8-3		flat	complete	42.5	Limestone	
23B15-3-3	527-1	M8-3		flat	complete	28.8	Limestone	
23B8-3-4	544-1	M8-3		flat	broken?	25.5	Limestone	
14B12-4-1	951-1	M8-13	West room	mano-like	broken	12.0	Limestone	Mano preform?
14B16-4-1	660-1	M8-13	West room	mano-like	complete	21.5	Limestone	Two worn facets
14B3-4-1	636-1	M8-13	West room	mano-like	broken	6.0	Limestone	Mano preform?
23B15-3-3	310-2	M8-3		mano-like	complete	16.6	Limestone	
14B20-3-3	849-1	M8-13	Center room	disk	undetermined	14.5	Limestone	

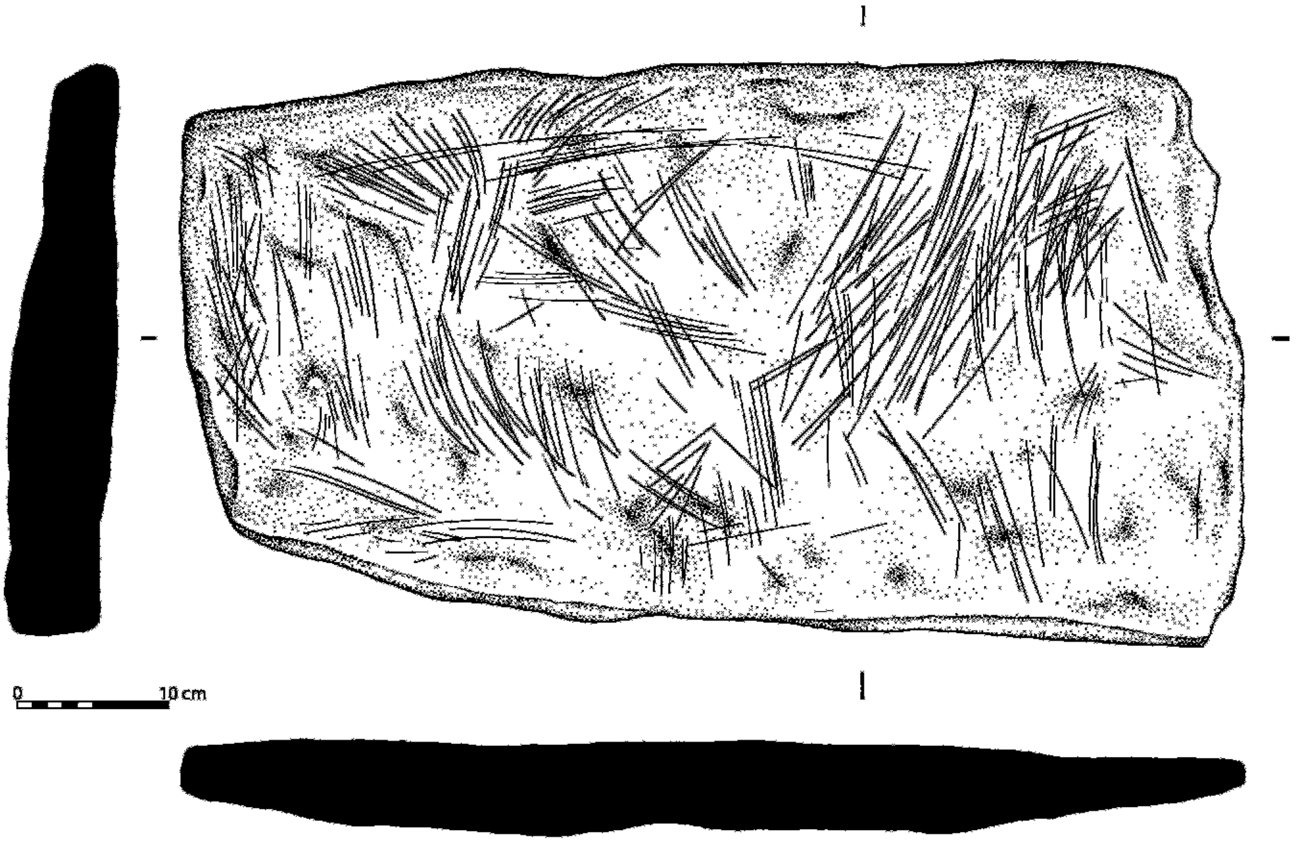


Figure 5.40. Limestone flat stone with fine incisions. Structure M8-8, 20A43-3-4, Cat. 1632-1. (1/5 scale)

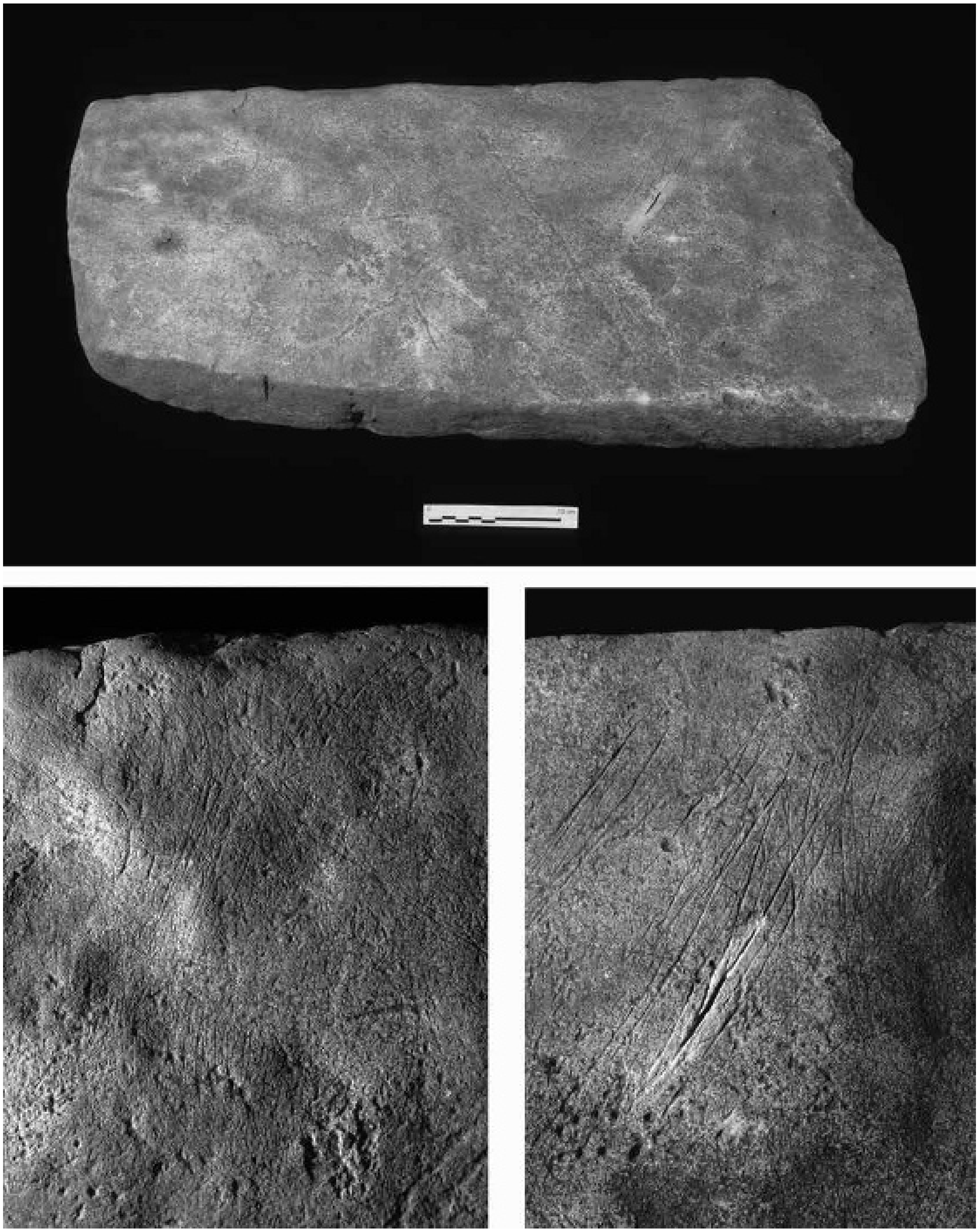


Figure 5.41. Limestone flat stone with fine incisions. Cat. 20A1632-1. Top: The stone was found near the northeastern corner of the north addition of Structure M8-8 in the position shown in the photograph with its rear edge parallel to the north wall. A craftsperson presumably sat in front of the stone and worked. (⅕ scale) Bottom: Close-ups of incisions (not to scale).

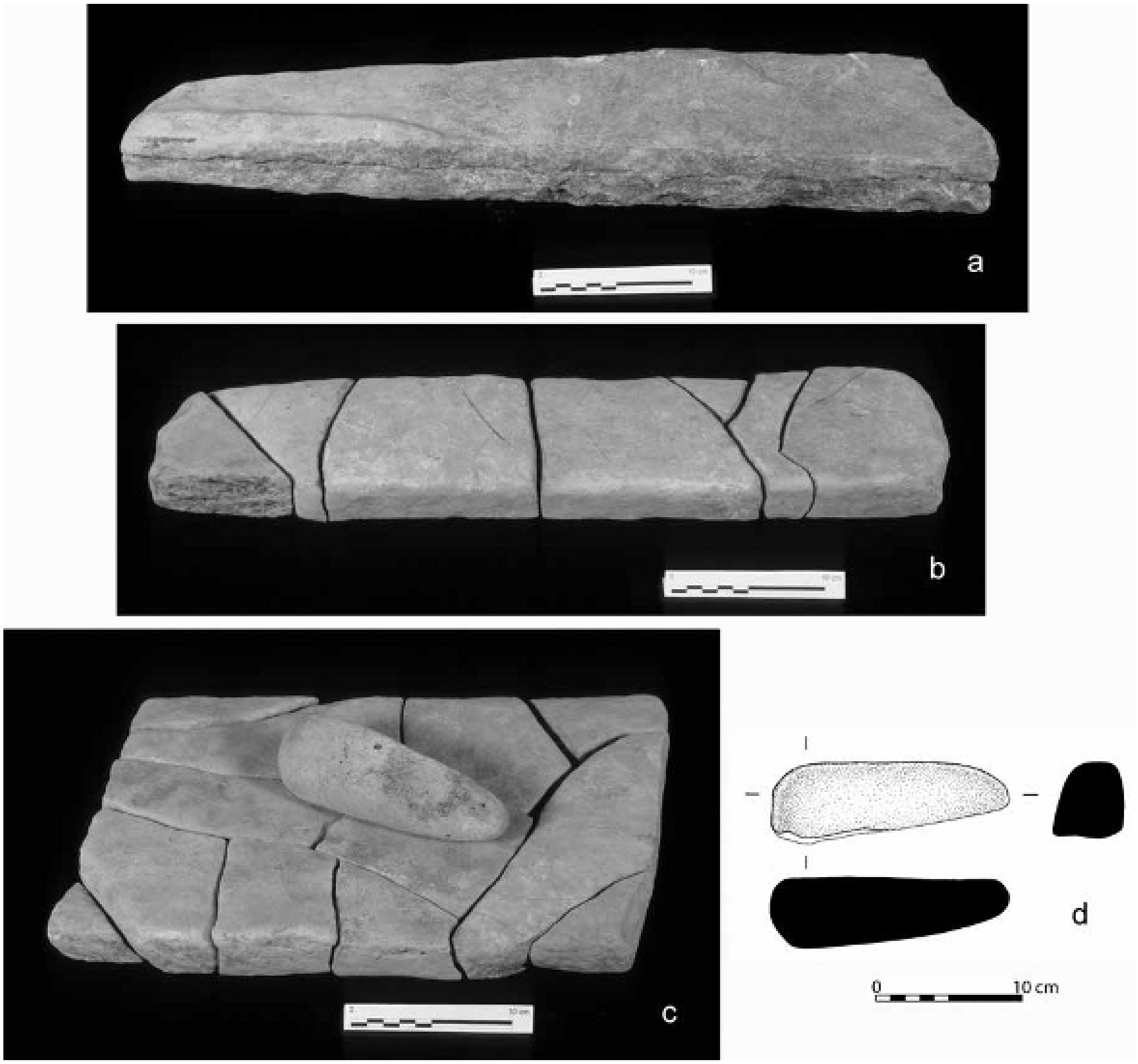


Figure 5.42. Limestone flat stones. (1⁄5 scale) (a) 23A30-3-2, Cat. 2047-1. (b) 23B14-3-1, Cat. 312-1. (c–d) Flat stone and a mano-like tool possibly used with it. 23B15-3-3. Flat stone: Cat. 310-1. Mano-like tool: Cat. 310-2.

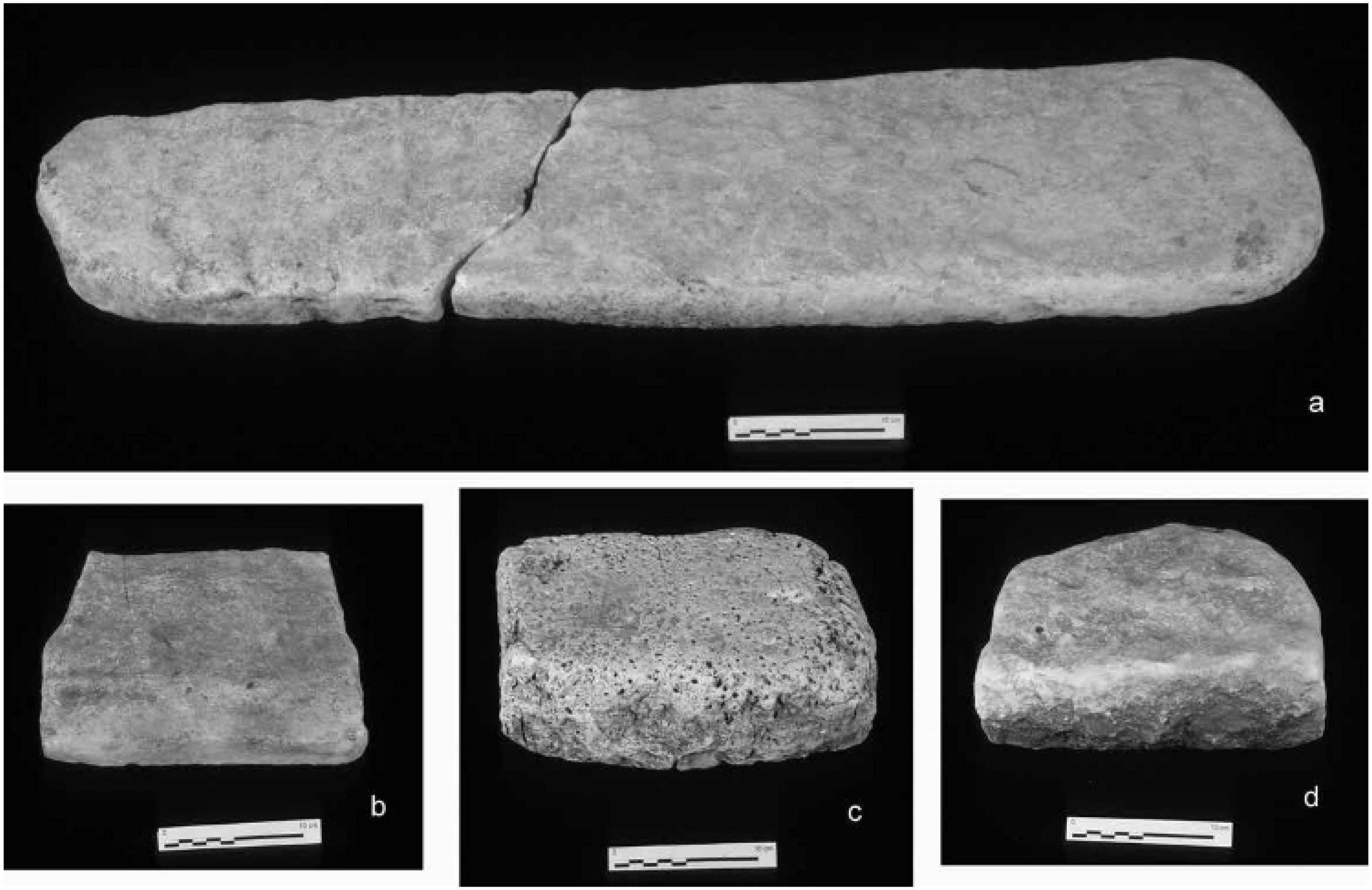


Figure 5.43. Limestone flat stones. (1⁄5 scale) (a) 23B14-3-2, Cat. 412-1. (b) 23B8-3-4, Cat. 544-1. (c) 23B15-3-3, Cat. 527-1. (d) 23B14-3-2, Cat. 483-1.

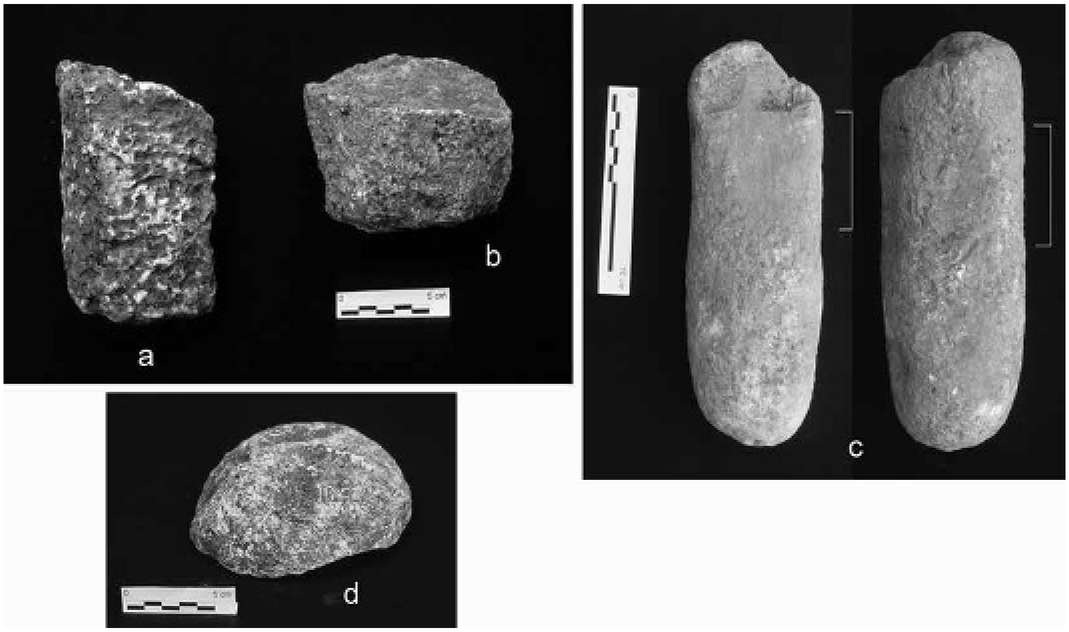


Figure 5.44. Limestone artifacts of unknown function. (¼ scale) (a–b) Possible mano preforms. (a) 14B12-4-1, Cat. 951-1. (b) 14B3-4-1, Cat. 636-1. (c) Tool with two facets worn from use. 14B16-4-1, Cat. 660-1. The photograph shows front views of the two worn areas, which are indicated by the white lines. (d) Round disk. 14B20-3-3, Cat. 849-1.

chapter

6

Stone Ornaments and Other Stone Artifacts

Takeshi Inomata and Markus Eberl

This chapter describes stone ornaments, pyrite artifacts and mirror backs, alabaster vessels, and other stone artifacts. Eberl analyzed petrified woods, and Inomata examined the other materials.

STONE ORNAMENTS

The category of stone ornaments includes all artifacts made of greenstone and ornaments made of other types of stone. Most objects were made of hard stone of colors ranging from dark green to light green and light gray, and most of them can be included in the generic category of greenstone. Although mineralogical identifications of stones have not been conducted, many of the hard stone artifacts are probably jadeite. Other stone artifacts may include softer serpentine. Two artifacts were made of an unidentified soft yellow stone of fine grain with fine veins of quartz. They are painted red or black and give an appearance of ceramics. Thirteen probable ornaments made of alabaster are included in this category, but alabaster vessels are discussed in a separate section. We gave WJD numbers to those pieces that appear to have been in use or storage immediately before abandonment. CJD numbers identify pieces that may have been strung together as single ornaments.

Classification

Artifacts were classified into the following forms (Table 6.1): (1) beads of round or similar shapes; (2) tubular beads; (3) button-shaped objects and thick rings; (4) pendants or other similar objects with perforations or holes; (5) mosaic pieces, inlays, or other flat objects without perforations; (6) possible cloth ornaments or pectoral pieces, (7) objects having irregular three-dimensional forms; and (8) possible unpolished raw materials (Figures 6.1–6.14).

Many of these objects are beads. Among them, the most common type is subspherical beads, which have round shapes whose heights are smaller than their diameters (Figure 6.1a–d). Most of the subspherical beads were made of hard stone, measuring 0.3 to 1.1 cm in height and 0.5 to 1.5 cm in diameter. One example from Operation 22A (Cat. 466-1) measures 2.4 cm in height and 3.4 cm in diameter (Figure 6.1b), and another from Operation 23A (Cat. 781-1) is 2.6 cm in height and 3.4 cm in diameter (Figure 6.1a). A bead made of yellow stone painted in red or black from Operation 22A (Cat. 1024-1) measures 1.6 cm in height and 2.2 cm in diameter (Figure 6.1c). The hard stone bead from Operation 22A has a perforation significantly larger than others (1.1 cm in diameter), while the yellow stone bead has a nearly straight small perforation (0.3 cm diameter). Other types of beads include disk shapes (round or rectangular transversal cross sections), spherical or drum shapes (higher height-to-diameter ratios than subspherical shapes), cylindrical, conical, squash shapes (ridges along the longitudinal directions), oval longitudinal cross sections, and irregular shapes (Figures 6.1–6.3). Most disk-shaped beads measure 0.2 cm in thickness and 0.4 to 0.7 cm in diameter. The majority of the beads of this type came from Operation 22A and were made of fragile, soft white material that was heavily burned and weathered (Figure 6.7m). One broken piece from Operation 24B (Cat. 236-2) probably measures roughly 3 cm in diameter. Nearly all the beads have a finished biconical perforation. Only one disk-shaped bead from Operation 14B (Cat. 211-1) has an unfinished perforation (Figures 6.5d, 6.10j). Only one side of this specimen is polished, and it might have functioned as something other than a bead.

Some beads appear to have been strung together. For example, 20 subspherical beads found in front of the north room of Structure M8-8 (Operation 20A) are similar in dimension and dark green color (CJD 20A-1) (Figure 6.10a). When tightly strung, they measure 21.0 cm in length and may have been a necklace. Eleven subspherical

TABLE 6.1. Types of Stone Ornaments.

			PALACE GROUP		CAUSEWAY AREA					BARRANCA ESCONDIDA	
CATEGORY	SUBCATEGORY	TOTAL	22A	22B	23A	20A	14A	14B	21A	24A	24B
Bead											
	Bead unspecified	4									4
	Round disk-shaped	119	113	1		1		1			3
	Rectangular disk-shaped	1									1
	Squash-shaped	1									1
	Oval-longitudinal section	7	2								5
	Subspherical	209	120	21	17	35			2	1	13
	Spherical/drum-shaped	13			1	7		1		1	3
	Cylindrical	1			1						
	Conical-shaped	1							1		
	Irregular-shaped	2									2
	Subtotal	358	235	22	19	43		2	3	2	32
Tubular											
	Round cross section	5								1	4
	Rectangular/square cross section	2							1		1
	Subtotal	7							1	1	5
Button-shaped and others											
	Button-shaped	14	3		1				2		8
	Thick ring	2	1		1						
	Subtotal	16	4		2				2		8
Pendants or others with perforations											
	Pendant	5	2			2	1				
	Flat ring	1	1								
	Hanging plaque	1	1								
	Other perforated objects	1			1						
	Subtotal	8	4		1	2	1				
Mosaic pieces or others without perforations											
	Mosaic/inlay/disk unspecified	2	1			1					
	Mosaic etc., rectangular	6	1		5						
	Mosaic etc., oval	1						1			
	Subtotal	9	2		5	1		1			
Cloth ornaments etc. (with multiple perforations)											
	Jester God	1			1						
	Square plaques	11			11						
	Unspecified	5	2		1			1			1
	Subtotal	17	2		13			1			1
Not clear whether pendants, mosaic pieces, or cloth ornaments		15	7	2		1					5
Irregular three-dimensional		5									5
Unworked raw material		3			2						1
Undetermined		17			2	1			1	2	11
Total		455	254	24	44	48	1	4	7	5	68

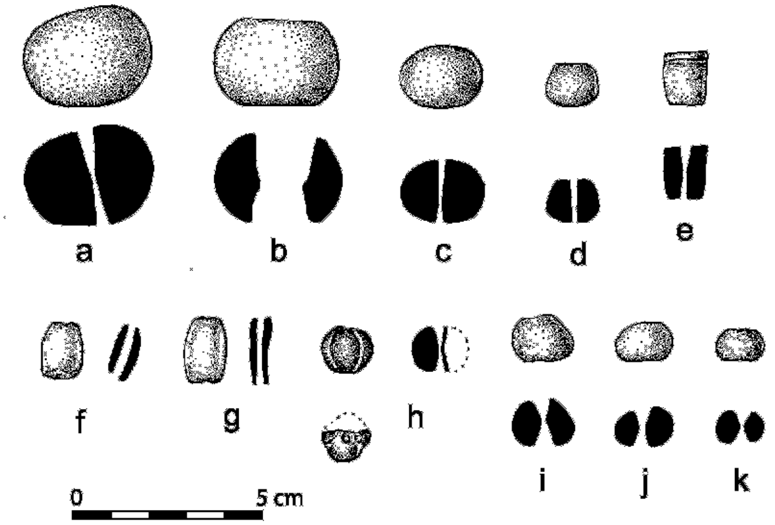


Figure 6.1. Stone beads. (a, b, d–k) Greenstone. (a–d) Subspherical, 23A29-3-4, Cat. 781-1. (b) 22A24-3-2, Cat. 466-1. (c) Painted yellow stone. 22A44-3-1, Cat. 1024-1. (d) 23A1-2-1, Cat. 827-1. (e) Conical, 21A42-3-1, Cat. 690-1. (f–g) Oval longitudinal section. (f) 22A45-3-1, Cat. 1033-1. (g) 22A45-3-1, Cat. 1038-1. (h) Squash-shaped, 24B10-2-1, Cat. 180-1. (i–k) Subspherical. (i) 23A41-3-3, Cat. 937-1. (j) 23A41-3-3, Cat. 939-1. (k) 23A41-3-2, Cat. 1212-1.

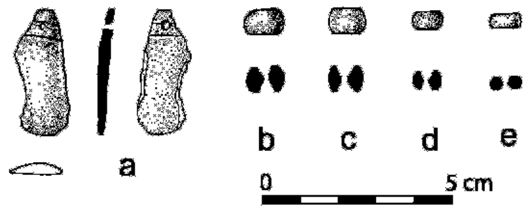


Figure 6.2. Greenstone ornaments from Structure M8-8, possibly forming a necklace (SJD 20A-1). (a) Pendant, 20A3-3-4, Cat. 246-1. (b–e) Subspherical beads. (b) 20A3-3-5, Cat. 315-1. (c) 20A20-3-3, Cat. 936-1. (d) 20A5-3-1, Cat. 412-1. (e) 20A5-3-1, Cat. 225-1.

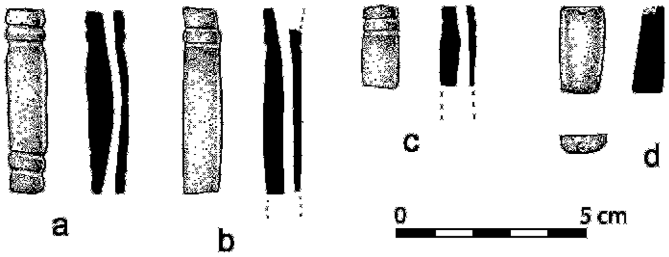


Figure 6.3. Tubular greenstone beads. (a) 24B18-2-1, Cat. 244-1. (b) 21A72-3-1, Cat. 1087-1. (c) 24B18-2-1, Cat. 244-2. (d) Perforation unfinished. 24B4-2-1, Cat. 204-2.

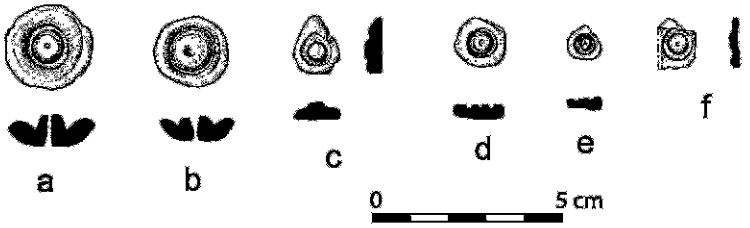


Figure 6.4. Button-shaped greenstone ornaments. (a–b) With perforation. (a) 23A12-3-4, Cat. 777-1. (b) 24B13-2-1, Cat. 251-9. (c–f) Without perforation. (c) 21A28-2-1, Cat. 523-1. (d) 22A45-3-1, Cat. 1038-2. (e) 24B13-2-1, Cat. 251-13. (f) 21A30-2-4, Cat. 761-1.

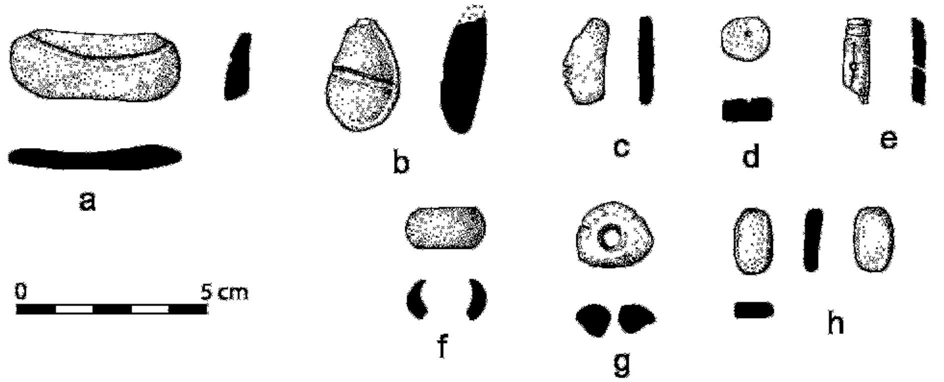


Figure 6.5. Stone ornaments. (a–g) Greenstone. (a) Incised plaque. 22A44-3-1, Cat. 1022-1. (b) Pendant. 14A8-4-1, Cat. 151-1. (c) Human-profile-shaped. 20A3-3-4, Cat. 408-1. (d) Round ornament or round disk-shaped bead with unfinished perforation. 14B13-1-3, Cat. 211-1. (e) Perforated object. 23A27-3-2, Cat. 753-1. (f–g) Thick rings. (f) 23A45-3-4, Cat. 1635-1. (g) 22A49-3-1, Cat. 1061-1. (h) Alabaster. Oval plaque. 14B25-1-1, Cat. 620-1.

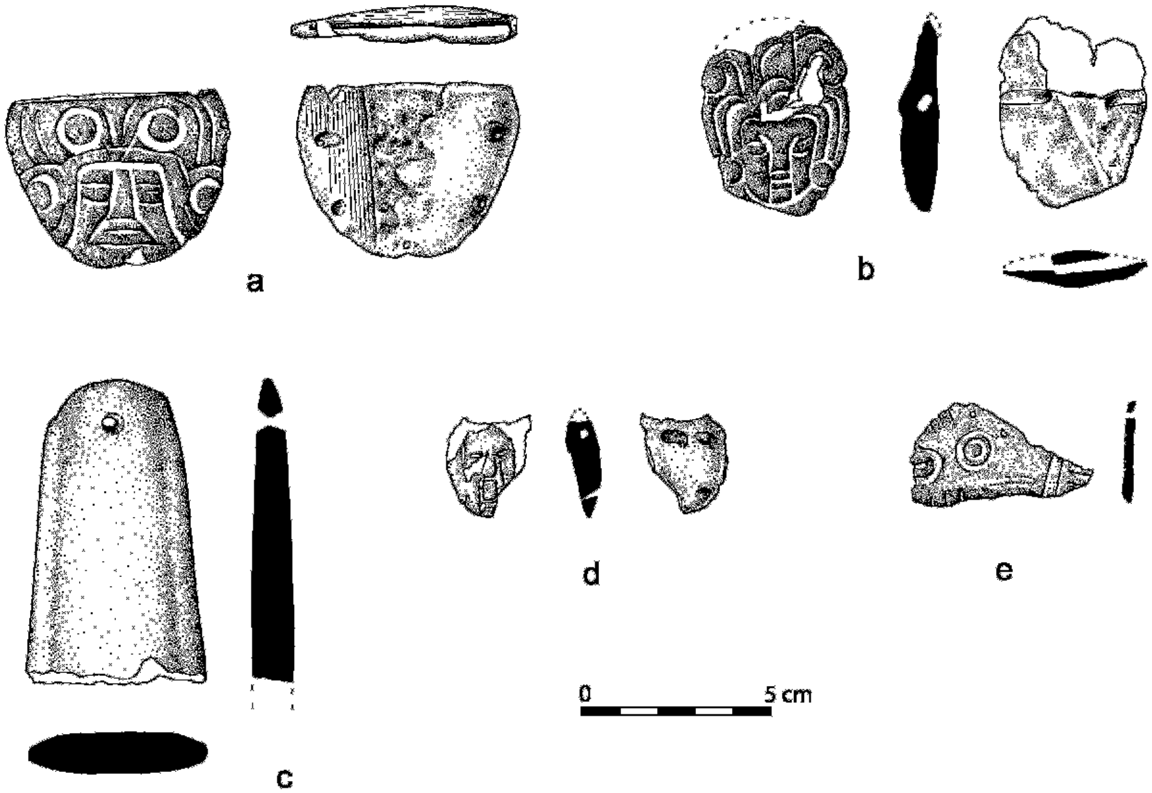


Figure 6.6. Greenstone ornaments. (a) Ornament with anthropomorphic face and multiple perforations. 22A25-3-4, Cat. 418-1. (b) Pendant with face of the Maize God. 22A24-3-2, Cat. 458-1. (c) Hanging plaque. 22A10-2-6, Cat. 500-1. (d) Ornament with anthropomorphic face and multiple perforations. 14B7-2-1, Cat. 398-1. (e) Ornament with multiple perforations. 23A31-3-4, Cat. 1168-1.

beads made of gray hard stone were found on the rear bench and on the room floor in front of it in the north room of Structure M8-4 (Operation 23A). They were probably used as a strung ornament (CJD 23A-1) (Figure 6.9k). Three small subspherical beads made of light green stone found in the northwestern corner of the north addition may also have been strung (CJD 23A-2) (Figure 6.9n). There may be more beads in the nearby unexcavated areas. It is less clear how other beads, particularly those from the ritual deposits of Operations 22A, 22B, 24A, and 24B, might have strung together. From the dense, probable termination-ritual deposit in front of the westernmost

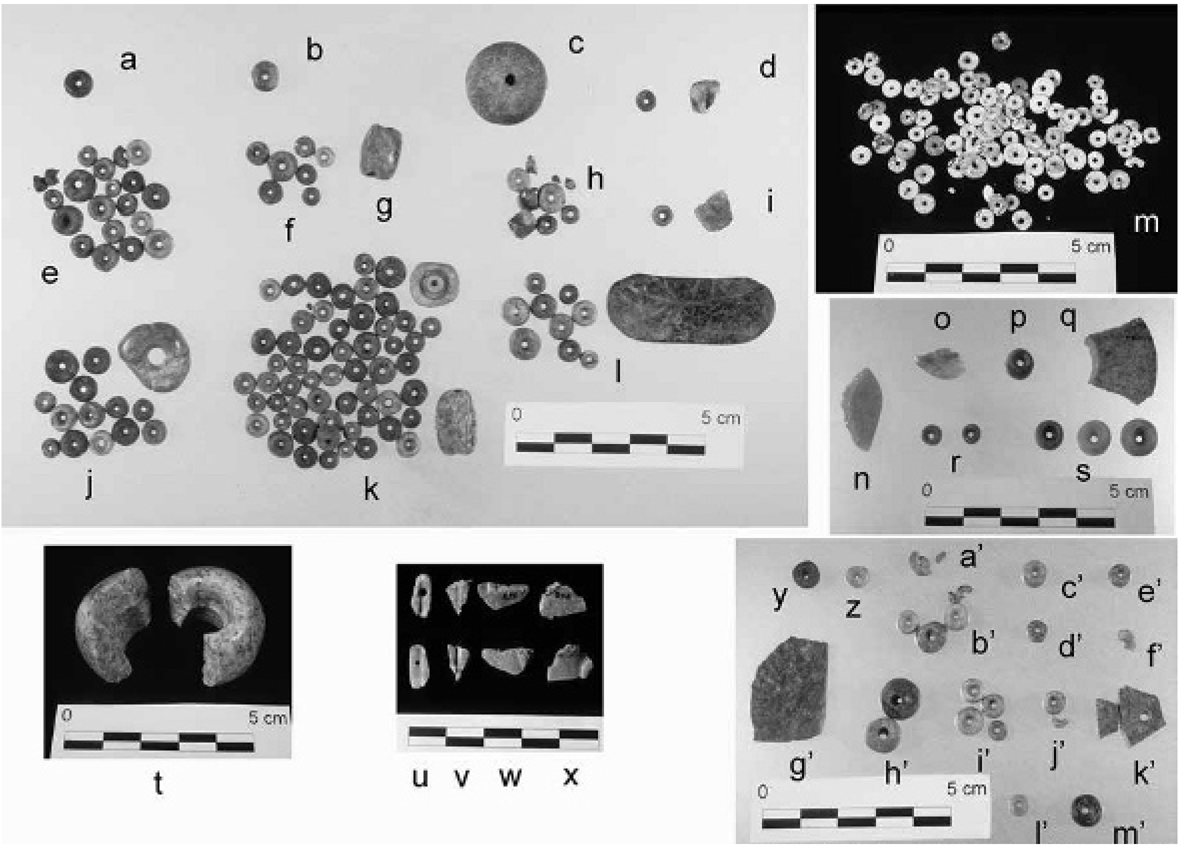


Figure 6.7. Stone ornaments from the termination ritual deposits of Structures M7-22 and M7-32. (a) 22A49-1-1, Cat. 968-1. (b) 22A45-1-1, Cat. 936-1. (c) 22A44-3-1, Cat. 1024-1. (d) 22A51-2-1, Cat. 2010. (e) 22A49-2-1, Cat. 1048. (f) 22A45-2-1, Cat. 1007. (g) 22A45-3-1, Cat. 1033-1. (h) 22A44-2-1, Cat. 1011. (i) 22A44-3-2, Cat. 1051. (j) 22A49-3-1, Cat. 1061. (k) 22A45-3-1, Cat. 1038. (l) 22A44-3-1, Cat. 1022. (m) Disk-shaped beads made of white stone. 22A45-3-1. (n) 22A28-3-1, Cat. 894-1. (o) 22A3-2-2, Cat. 204-1. (p) 22A3-3-2, Cat. 298-1. (q) 22A6-3-3, Cat. 725-1. (r) (two beads) 22A9-3-4, Cat. 318. (s) (three beads) 22A9-2-5, Cat. 581. (t) Fragments of a bead. Left: 22A9-3-2. Right: 22A24-3-2, Cat. 466-1. (u–x) Fragments that may belong to an ornament carved on two sides, possibly representing the Jester God. The photograph shows the two sides of four fragments. 22A12-3-1, Cat. 856. (y) 22B39-3-2, Cat. 511-1. (z) 22B38-3-2, Cat. 617-1. (a') 22B54-2-1, Cat. 468. (b') 22B54-3-2, Cat. 647. (c') 22B53-3-1, Cat. 655-1. (d') 22B53-3-3, Cat. 666-1. (e') 22B53-3-5, Cat. 671-1. (f') 22B36-3-1, Cat. 688-1. (g') 22B13-3-1, Cat. 499. (h') 22B42-3-1, Cat. 453. (i') 22B42-3-4, Cat. 519. (j') 22B43-3-3, Cat. 538. (k') 22B44-3-1, Cat. 482-1. (l') 22B2-3-2, Cat. 186-1. (m') 22B3-3-3, Cat. 177-1.

room of Structure M7-22 (Operation 22A, Units 44, 45, 49, and 51), excavators unearthed 110 disk-shaped beads, most of them made of soft white stone (Figure 6.7m), and 111 subspherical beads, mostly made of green to gray hard stone (Figure 6.7a–l). Many of them are similar in dimension and may have been strung in one or more ornaments. Ten light green stone beads found in the termination-ritual deposit in the central room of Structure M7-32 (Operation 22B, Units 2, 3, 13, 42, and 43) may have been strung along with a pendant (Figure 6.7h'–j', l'–m'). In addition, some of the beads found around the northern exterior bench of Structure M7-32 (Operation 22B, Units 53 and 54) might have been strung (Figure 6.7a'–e'). Unlike the beads from Operations 22A and 22B, those from Operations 24A and 24B are diverse in dimension and stone type. They do not seem to have been strung together. A modest number of beads found in the rapidly abandoned structures did not have clear association with other pieces. Some of them may have been attached to such ornaments as masks or ceremonial attire.

Seven tubular objects with heights at least two times larger than their diameter were recovered in Operations 21A and 24B. The relatively small example measuring 0.6 cm in diameter found in Operation 24B (Cat. 236-5) may have been strung with subspherical or other beads (Figure 6.11h). Five specimens (Cat. 21A1087-1, 24A162-1, 24B192-2, 24B244-1, and 24B244-2) measure around 1 cm in diameter and have circumferential bands defined

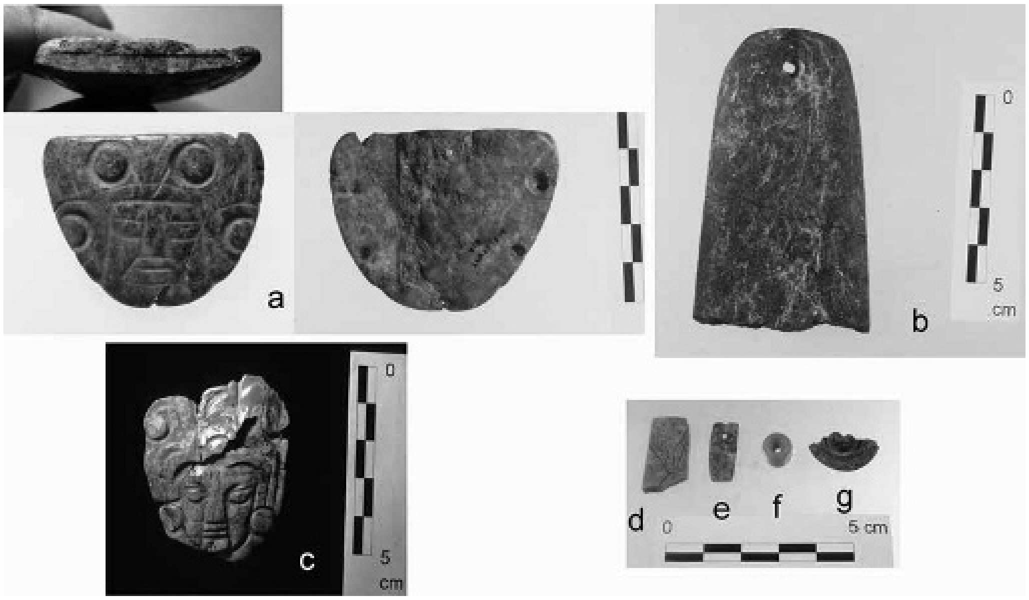


FIGURE 6.8. Greenstone ornaments associated with the easternmost room of Structure M7-22. (a) Ornament with anthropomorphic face and multiple perforations. 22A25-3-4, Cat. 418-1. (b) Hanging plaque. 22A10-2-6, Cat. 500-1. (c) Pendant with face of the Maize God. 22A24-3-2, Cat. 458-1. (d) 22A10-2-6, Cat. 502-1. (e) 22A14-3-3, Cat. 820-1. (f) 22A24-3-1, Cat. 459-1. (g) 22A24-3-2, Cat. 453-1.

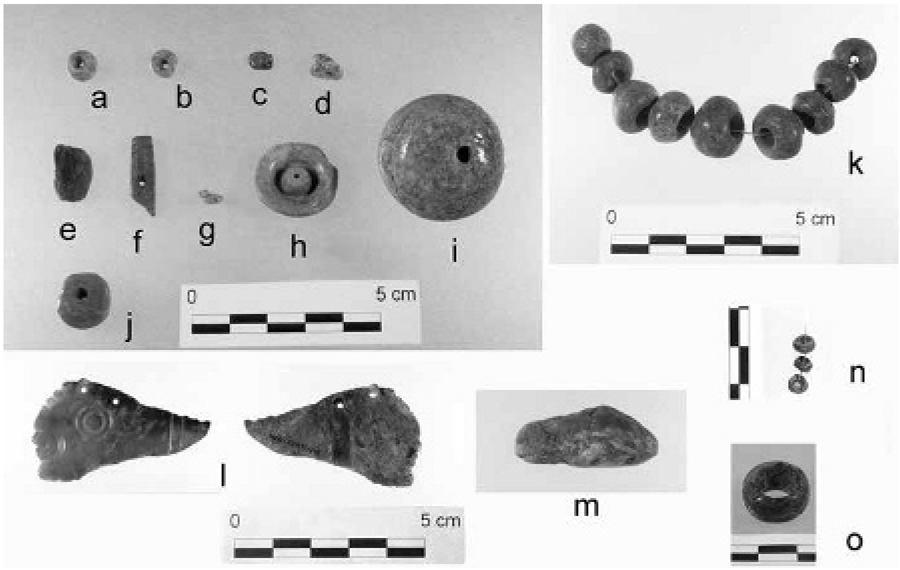


FIGURE 6.9. Stone ornaments found in and around Structure M8-4. (a) 23A30-3-2, Cat. 2086-1. (b) 23A42-3-3, Cat. 1100-1. (c) 23A46-3-1, Cat. 2077-1. (d) 23A48-3-4, Cat. 1463-1. (e) 23A27-3-2, Cat. 2155-1. (f) 23A27-3-2, Cat. 753-1. (g) 23A12-3-3, Cat. 716-1. (h) 23A12-3-4, Cat. 777-1. (i) 23A29-3-4, Cat. 781-1. (j) 23A1-2-1, Cat. 827-1. (k) Beads possibly belonging to an ornament. 23A41-3-3, 41-3-2, 41-3-1, and 18-3-2, CJD 23A-1. Two other beads were stolen during excavation. (l) Ornament with multiple perforations. 23A31-3-4, Cat. 1168-1. (m) Unworked nodule. 23A18-3-1, Cat. 2120-1. (n) Beads possibly belonging to an ornament. 23A36-3-3, CJD 23A-2. (o) Ring made of painted yellow stone. 23A43-3-4, Cat. 1635-1.

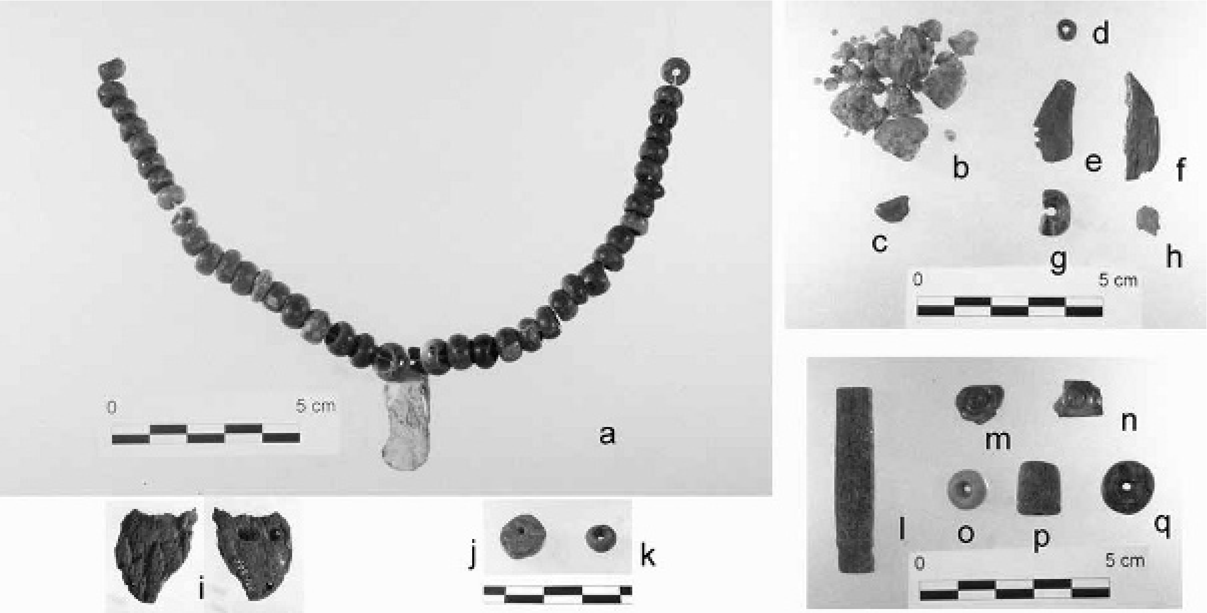


FIGURE 6.10. Stone ornaments. (a–h) Associated with Structure M8-8. (a) Beads and a pendant possibly forming a necklace. CJD 20A-1. Beads: 20A5-3-1, 3-3-5, 5-3-3, 5-3-2, 5-3-4, 3-3-4, 20-3-3, and 12-3-2. Pendant: 20A3-3-4, Cat. 246-1. (b) 20A22-3-1, Cat. 1346-1. (c) 20A22-2-2, Cat. 1120-1. (d) 20A12-3-1, Cat. 849-1. (e) 20A3-3-4, Cat. 408-1. (f) 20A3-3-4, Cat. 246-2. (g) 20A5-3-1, Cat. 236-1. (h) 20A20-3-3, Cat. 933-1. (i–k) Associated with Structure M8-13. (i) 14B7-2-1, Cat. 398-1. (j) 14B13-1-3, Cat. 211-1. (k) 14B18-2-2, Cat. 346-1. (l–q) Associated with Structure M7-34. (l) 21A72-3-1, Cat. 1087-1. (m) 21A28-2-1, Cat. 532-1. (n) 21A30-2-4, Cat. 761-1. (o) 21A56-3-3, Cat. 1075-1. (p) 21A42-3-1, Cat. 690-1. (q) 21A42-3-1, Cat. 737-1.

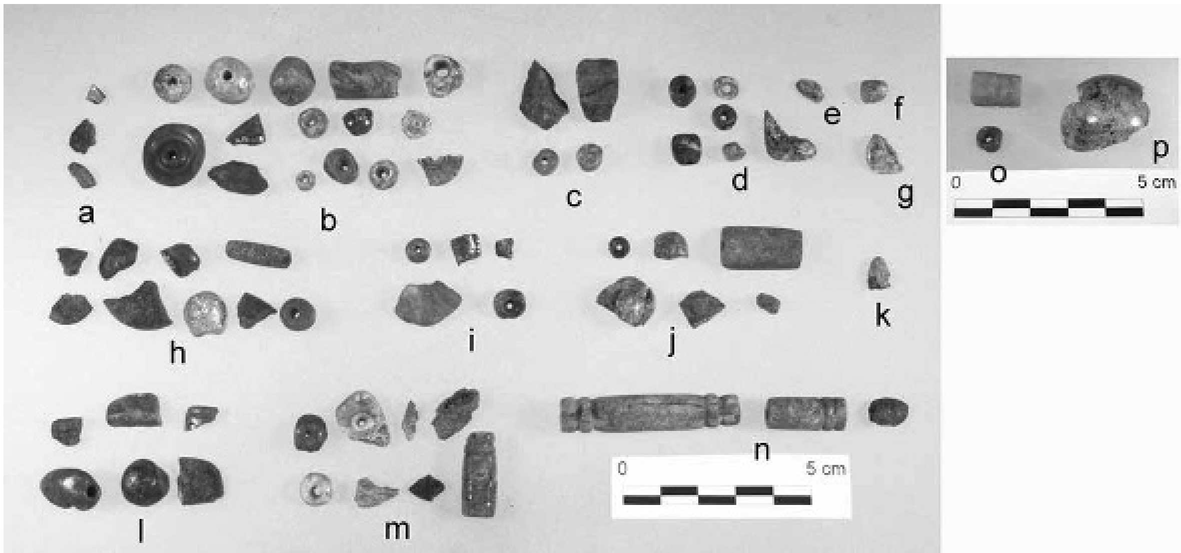


FIGURE 6.11. Stone ornaments found in the Barranca Escondida. (a–n) Found in and around the knoll. (a) 24B13-1-1, Cat. 157. (b) 24B13-2-1, Cat. 251. (c) 24B13-2-2, Cat. 257 and 258. (d) 24B2-2-1, Cat. 219. (e) 24B2-2-2, Cat. 225-1. (f) 24A12-1-1, Cat. 145-1. (g) 24A12-1-1, Cat. 160-1. (h) 24B5-2-1, Cat. 236. (i) 24B1-2-1, Cat. 231. (j) 24B4-2-1, Cat. 204. (k) 24B3-2-1, Cat. 209-1. (l) 24B10-2-1, Cat. 180. (m) 24B6-2-1, Cat. 192. (n) 24B18-2-1, Cat. 244. (o–p) Found in the chasm. (o) Surface collection, Cat. 162. (p) 24A18-1-1, Cat. 210-1.

by grooves near one or both ends (Figure 6.3a–c). Some of them may be parts of ear ornaments worn by humans, masks, or sculptures. One example (24B204-2) has a rectangular shape and an unfinished perforation (Figure 6.3d).

Button-shaped objects include artifacts with a circular groove or carving that leaves a protruding central part (Figure 6.4). Those with a conical shape and central perforation may have been ear ornaments (Pillsbury et al. 2012:263; Willey 1972:147–148). Most of the flat button-shaped objects do not have finished perforations, and they may have been used as mosaics or inlays. It is not clear whether thick rings were parts of ear ornaments or of other types of strung ornaments. A sample from Structure M7-22 (Cat. 22A1061-1) is made of greenstone and has an irregular circular shape that measures 0.8 cm in thickness and 2.0 cm in diameter (Figure 6.5g). There are four incisions radiating from a perforation on one side. The ring from Structure M8-4 (Cat. 23A1635-1) is made of soft yellow stone and is painted black (Figures 6.5f, 6.9o). It measures 1.1 cm in height and 2.0 cm in diameter. It has a large (1.3-cm diameter) biconical perforation.

Objects with single perforations may have been pendants. Broken pieces found in front of the north room of Structure M8-8 (Cat. 20A246-1, 20A246-2, and 20A933-1) may have been strung with other beads of CJD 20A-1 (Figures 6.2a, 6.10a). An elaborate pendant made of light green stone was associated with the easternmost room of Structure M7-22 (Cat. 22A458-1) (Figures 6.6b, 6.8c). It is horizontally perforated, and its back side is only slightly smoothed. Its carving appears to show an anthropomorphic face with foliated head, probably representing the Maize God (see Pillsbury et al. 2012:245–247; Taube 2005). Multiple jade pieces found in the Cenote of Sacrifice at Chichen Itza exhibit similar motifs (Proskouriakoff 1974:Plate 53). The centrally perforated piece from Structure M8-4 (Cat. 23A753-1) may have been attached to clothing or other types of attire (Figures 6.5e, 6.9f). A broken object with a perforation near one end found in the easternmost room of Structure M7-22 (Cat. 22A500-1) was most likely one of the ceremonial plaques hung along the belt of a ruler (Figures 6.6c, 6.8b) (see Pillsbury et al. 2012:179–189). It is made of dark green stone with shiny veins, and there is no carving on the surface.

Artifacts with multiple perforations along the edges were probably attached to clothes, headdresses, pectorals, elaborate necklaces, or other types of attire. A dark green stone object found in front of the easternmost room of Structure M7-22 (Cat. 22A418-1) has two perforations on each side and one at the bottom (Figures 6.6a, 6.8a). There is an unfinished hole near the top. The manufacturer redid another perforation slightly below the unfinished one after the unsuccessful attempt. One side shows a face with scrolls above the head and circular ear ornaments, which resemble Cat. 22A458-1 (see above). Although the carving of this piece is more stylized, it most likely represents the Maize God, as Cat. 22A458-1 does. The other side was partially string-cut, and the rest of the irregular surface was partially polished. The straight edge at the top was string-cut to the midpoint, and the rest was broken and then smoothed.

A thin green stone found in front of the center room of Structure M8-4 (Cat. 23A1168-1) is unsmoothed on one side and gives the appearance of a broken piece (Figures 6.6e, 6.9l). The positions of two perforations parallel to an edge, however, suggest that the piece was a complete one. The other side is well polished and carved with a possible profile of a fish. It was probably hung with a string passing through the two perforations near the upper edge. A broken and severely weathered object uncovered in front of the west room of Structure M8-13 (Cat. 14B398-1) has at least four perforations along the edge (Figures 6.6d, 6.10i). One side appears to have a carving of a face with shallow grooves.

Two unbroken pieces without perforation may have been mosaic pieces of inlays, unless they were unfinished ornaments. A small piece found in front of the north room of Structure M8-8 (Cat. 20A408-1) represents a human profile without carving on the flat surface (Figures 6.5c, 6.10e). Its material has tentatively been identified as gneiss. A black stone piece from a termination ritual to the west of Structure M7-22 (Cat. 22A1022-1) has an uneven surface with a single incision (Figures 6.5a, 6.7l). The use of other broken flat pieces remains undetermined, partly because it is not clear whether they had perforations. Two small fragments of gray stone from Operation 24B (Cat. 192-1 and 236-1) were probably parts of the same flat object. They have fine incisions on both sides, including a possible bird head and parts of glyphs (Figure 13.3). Others have various shapes, including a flat ring, a flat bar, a circular disk, a disk with straight edges, and a possible flower shape.

Three gray stones in the shape of partially smoothed pebbles were found in Operation 24B (Cat. 251-14, 251-15, and 257-2) (Figure 6.11b–c). It is not clear whether they are preforms for beads or other ornaments. Two unworked pieces of greenstone were found in Operation 23A (Cat. 2120-1 and 2155-1) (Figure 6.9e, m).

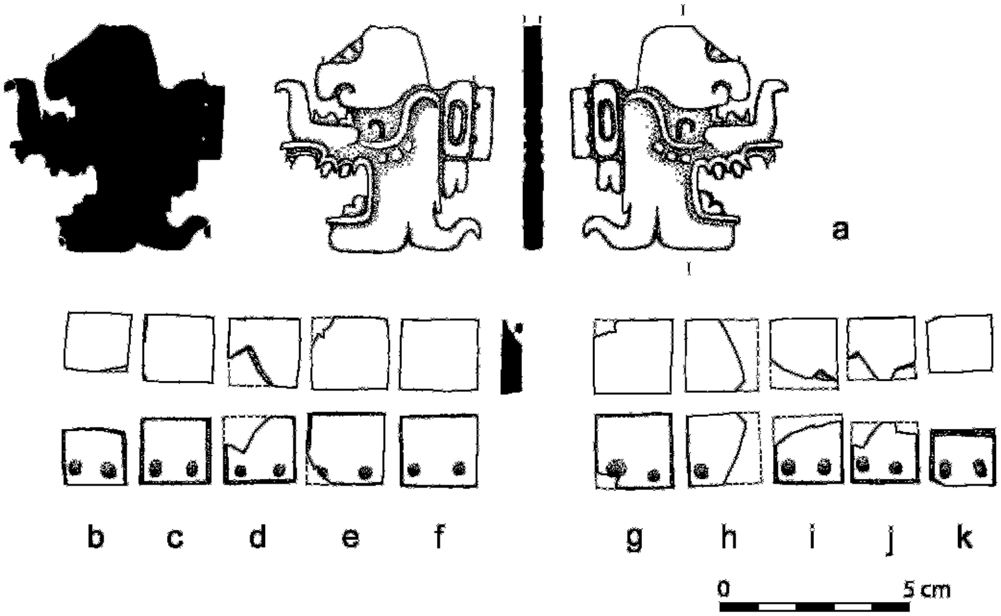


Figure 6.12. Jester God diadem made of alabaster. 23A5-3-1 except (k) (Structure M8-4). (a) Jester God ornament. Cat. 661-1. (b–k) Square plaques. Top: Front sides. Bottom: Back sides in upside-down positions. (b) Cat. 661-4. (c) Cat. 661-3. (d) Cat. 797-1. (e) Cat. 661-2. (f) Cat. 482-1. (g) Cat. 469-1. (h) Cat. 133-1. (i) Cat. 797-2. (j) Cat. 661-5. (k) 23A26-2-1, Cat. 294-1.

Jester God Headband

A set of unique objects deserves its own discussion. During the excavation of the south room of Structure M8-4, excavators found a concentration of objects made of alabaster, pyrite, and siltstone in the southwestern part of the bench. These artifacts were probably parts of a headband and other ceremonial attire. Houston first recognized an alabaster object (Cat. 23A661-1) as an image of the Jester God, a symbol of divine rulership (Fields 1991; Freidel 1990). Next to it were square alabaster plaques, each with two perforations (Figures 6.12, 6.13). These alabaster objects were most likely sewn to a strip of leather or textile, forming a royal headband. They appear identical to the Jester God headband carved on Stelae 7 and 19 as part of the elaborate costume of Tahn Te' K'inich, Ruler 5, which tempts us to entertain the idea that these archaeological finds are the very pieces worn by the last ruler of Aguateca and depicted on the stelae (Eberl and Inomata 2001).

The Jester God carving measures 0.55 cm in thickness and 5.8 cm in width and has identical images on the two sides. It is missing the protrusion from the forehead, a part of the cross-band in the forehead, and the rear head. The carving was probably tied to a band through two nearly straight perforations in the rear part (1.8 mm diameter). There are small biconical perforations through the nose, chin, and lower back scroll. The stela carvings show that small beads were attached to these places. These beads may have been made of perishable material: our excavation using $\frac{1}{16}$" screen did not recover any stone beads from this area.

The square plaques measure 0.48 to 0.58 cm in thickness, 1.7 to 2.1 cm in length, and 1.5 to 2.0 cm in width. Their widths are about the same as that of the rear protrusion of the Jester God carving. Some edges are slightly beveled in, and some show traces of sawing. Each has two biconical perforations made from a long edge and the back. The perforated edge was probably the upper side of a plaque, through which it was sewn onto a band. We recovered ten complete or reconstructible plaques (Cat. 23A133-1, 29401, 469-1, 482-1, 661-2 to 5, 797-1, and 797-2) and two small fragments with perforations (Cat. 23A661-6). The total number of plaques may have been twelve. When tied on a band, the ten plaques measure roughly 20 cm in length, and that of the twelve would have been 23 cm. When the band is placed on an undeformed adult head, the twelve plaques cover the person's forehead to the area above the ears (Figure 6.13). If they are the ones depicted on the stelae, the sizes of the plaques carved on the stelae seem to be exaggerated.

Some parts of these alabaster objects preserved their original color, nearly translucent white, but others were

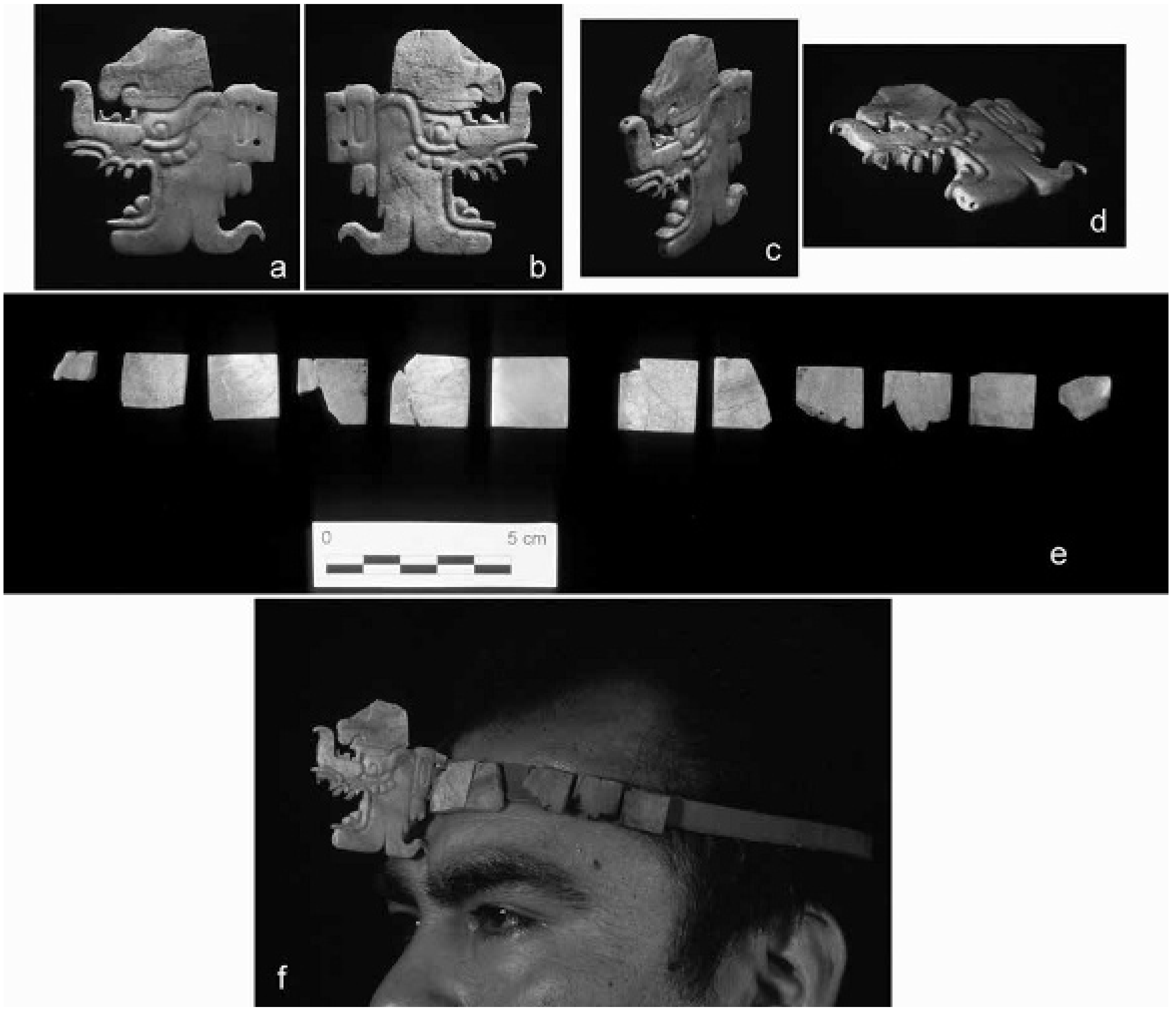


FIGURE 6.13. Jester God diadem made of alabaster. (a–d) Different views of the Jester God ornament. 23A5-3-1, Cat. 661-1. (e) Square plaques. See Figure 6.12 caption for detail. (f) Possible reconstruction of the diadem.

burned and have become opaque white, gray, or brown, in which the natural layers of alabaster are more visible. A burned alabaster bowl found in a nearby area shows that severe burning makes alabaster fragile and causes it to laminate along the natural layers as it disintegrates through the decarbonation process. Unrecovered fragments of the headband parts might have been burned to such a degree. It is probable that all the pieces of the headband were originally translucent white, which accords with its Mayan name, *sak hu'nal* (white headband).

Other examples of Jester God ornaments have been found at Palenque (Ruz Lhuillier 1958:Lámina XLVIII; Ruz Lhuillier 1973:Figures 218, 242), at the Cenote of Sacrifice at Chichen Itza (Proskouriakoff 1974), at Topoxte (Hermes 2000), at Nebaj (Smith and Kidder 1951), at Yaxuna (Freidel et al. 2003:208), possibly at Tonina (Easby 1961:62), at Cancuen (Kovacevich 2006:Figures 5.21, 5.22), and at El Perú (Lee 2005). An unprovenienced one has also been reported (Schele and Miller 1986:Plate 11). Unlike the Aguateca piece, most of them are made of jade.

Other stone ornaments found in the same area were mosaic pieces for a headdress or other types of ceremonial attire. Given the proximity to the Jester God headband, this possible ceremonial gear may also have been used by the ruler; it includes four thin, rectangular plaques (0.21–0.29 cm in thickness) with beveled-in edges (Cat. 23A797-3 to 5, and 470-1) (Figure 6.14). The material has tentatively been identified as siltstone. A broken piece of a similar shape appears to be ceramic, but it contains quartz and mica tempers and differs from any ceramic vessel pastes known from the site. Some pyrite and bone pieces found in this area may have also formed parts of the same or associated attire. They are discussed in the sections on pyrite and bone.

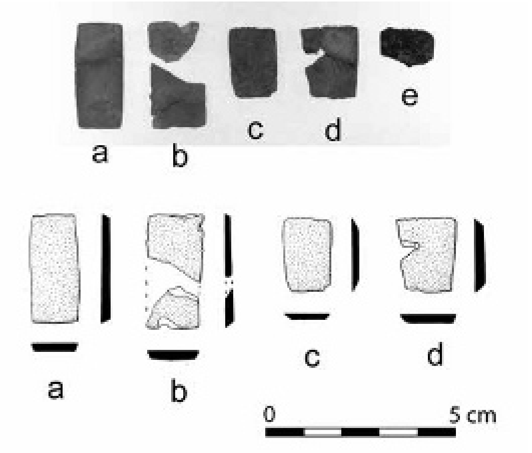


FIGURE 6.14. Rectangular plaques. Possibly siltstone. 23A5-3-1 (Structure M8-4). (a) Cat. 797-3. (b) Cat. 797-5. (c) Cat. 470-1. (d) Cat. 797-4. (e) Cat. 490-1.

In addition, four small fragments of greenstone found in the termination ritual deposits of Structure M7-22 (Cat. 22A856-1, 22A856-2, 22A856-3, and 22A856-4) appear to belong to one ornament, which may represent a Jester God image (Figure 6.7u–x). They measure 0.4 cm in thickness, are carved on both sides, and have at least one perforation along a straight edge.

Discussion

There is no clear evidence that greenstone artifacts were manufactured in the excavated structures in the Causeway area. Potential exceptions include the possible raw materials found in Structure M8-4, but these unworked stones may have been kept for reasons other than future manufacturing. We note that the residents of Structure M8-4 produced pyrite ornaments (see the following section), and we need to consider the possibility that they occasionally worked on greenstone or other types of stone.

The considerable quantity of greenstone objects in Structures M8-4 and M8-8 attests to the high status of these residences and the abruptness of their abandonment, although it is still probable that the residents or the enemies carried away the most valuable greenstone objects. The scarcity or absence of such materials in Structures M8-2, M8-3, and M8-13 probably reflects the lower status of the residents or the nonresidential functions of these structures. Some of the objects may not have belonged to the residents of the structure. In particular, the Jester God ornament found in Structure M8-4 poses an important question. The Jester God was closely associated with rulership, although these ornaments may also have been used by other elites, as shown in the Bonampak murals (Miller 1986). A possible interpretation is that the residents of Structure M8-4 were responsible for preparing and maintaining royal attire. Another possibility is that the Jester God was owned and used by the head of this household. We favor the first possibility, partly because of the similarity that the alabaster piece shows to the depictions of the Jester God diadem worn by the Aguateca ruler, Tahn Te' K'inich, on Stelae 7 and 19. It is possible that high-status courtiers were responsible for storing and maintaining the royal regalia, as implied by the scene of Bonampak Panel 1 in which nobles are handing a Jester God headband to the king (Houston and Inomata 2009:143, 262). The unique evidence of pyrite working discussed below also supports this view.

The stone ornaments found inside and in front of the easternmost room of Structure M7-22 were probably parts of the regalia or ceremonial attire used by the ruler and his family. In particular, the greenstone plaque (Cat. 22A500-1) is similar to those depicted in stelae at Aguateca and other sites. It appears that these objects were originally stored inside the sealed easternmost room. The enemies who opened this room probably took some important symbolic objects and left others. It is plausible that a set of three or more plaques was stored in the room. The invaders may have taken other plaques and left the broken one. They appear to have intentionally broken some artifacts, such as the pendant with a carved face (Cat. 22A458-1). After breaking it, they left two fragments of the headdress part of the pendant inside the room on the fallen stones that were used to seal the room, and threw the fragments with the face and the central part of the headdress in front of the room 2 to 3 m away from the other pieces (Figure 6.15).

Numerous greenstone objects were also found in the dense deposits in the eastern front room and in front of the westernmost room of Structure M7-22 and in the central access and to the north of Structure M7-32. The presence of these artifacts indicates that these deposits, with a large amount of sherds, bones, and lithics, are not middens left by impoverished squatters but symbolic deposits placed by the attackers during termination rituals. It is not clear whether the stone ornaments in these ritual deposits originally belonged to the Aguateca royal family or other residents of this center or whether the enemies brought them from other places. Some ornaments, such as Cat. 22A856-1 (a possible Jester God diadem), may have been intentionally broken, but many were complete (Table 6.2).

In the Barranca Escondida area (Operations 24A and

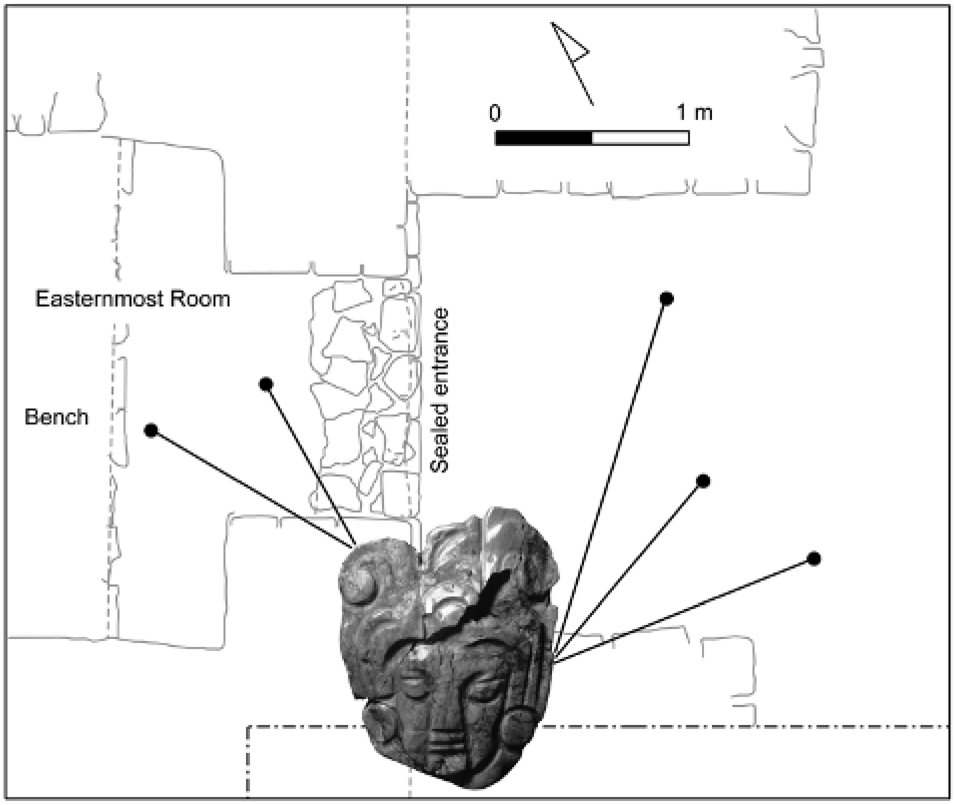


Figure 6.15. Distribution of fragments of a jade pendant (Cat. 22A458-1) inside and outside the easternmost room of Structure M7-22.

Table 6.2. Condition of Stone Ornaments.

			Palace Group		Causeway Area					Barranca Escondida	
Condition	**Preservation**	**Total**	**22A**	**22B**	**23A**	**20A**	**14A**	**14B**	**21A**	**24A**	**24B**
Complete or almost complete											
	Well preserved	214	117	17	17	42	1	2	1	1	16
	Burned or weathered	137	107	1	14			1	2		12
	Subtotal	351	224	18	31	42	1	3	3	1	28
Broken											
	Well preserved	67	17	6	3	3			2	3	33
	Burned or weathered	34	13		8	3		1	1	1	7
	Subtotal	101	30	6	11	6		1	3	4	40
Undetermined		3			2				1		
Total		455	254	24	44	48	1	4	7	5	68

24B), the quantity of stone ornaments compared with other types of artifacts was particularly high, indicating the ritual nature of the deposits associated with Early to Late Classic stelae. At least some of these objects were deposited by the Tamarindito elite before the Dos Pilas/Aguateca dynasty was established. The majority of the stone ornaments were found on the stone knoll (Operation 24B) rather than around the stela fragments (Operations 24A and 24B). A small number of greenstones recovered from Unit 12 of Operation 24A may have fallen from the knoll. Excavators also found a small number of greenstone objects in the cave-like chasm (Operation 24A

TABLE 6.3. Types of Pyrite Artifacts.

			PALACE GROUP		CAUSEWAY AREA					BARRANCA ESCONDIDA
CATEGORY	SUBCATEGORY	TOTAL	22A	22B	23A	20A	14B,C&D	23B	21A	24B
Nodules		10	2	2	5					1
Three-dimensional forms										
	Conical	2	1	1						
	Cylindrical	10	4	3	3					
	Other/undetermined	7		1	5				1	
	Subtotal	19	5	5	8				1	
Plaques										
	Quadrangular	1	1							
	Quadrangular with incisions	3			3					
	Oval	3			2				1	
	Round with incisions	2			1				1	
	Star-shaped	1			1					
	Flat ring	1				1				
	Plaques, undetermined (possibly include mosaic pieces)	20			20					
	Subtotal	31	1		27	1			2	
Mosaic pieces										
	General	404	145	29	218	6	2	1	3	
	Round edge pieces	50	29	3	16		1		1	
	Subtotal	454	174	32	234	6	3	1	4	
Recycled rectangular ornaments										
	Cut but edges not polished	2			2					
	Cut and edges being polished	17			17					
	Cut and edges polished	42			42					
	Rounded corners (one piece making a rectangle)	1			1					
	Rounded corners (two pieces making a rectangle)	12			12					
	Undetermined	3			3					
	Subtotal	77			77					
Total		591	182	39	351	7	3	1	7	1

Unit 18). It appears that the knoll and the chasm were the main foci of the deposit of greenstone objects. The high ratio of broken objects was notable in comparison to those from the residential area (Table 6.2). Although some stone ornaments from the Barranca Escondida area may have been burned, these breakages were probably not caused by fire alone; exposure to intense heat in the burned structures and in the termination rituals in the residential areas did not result in such a high percentage of broken stones. Smashed greenstone ornaments have also been found at other sites, including Cerros and Chichen Itza, most likely resulting from ritual activities (Garber 1983; Proskouriakoff 1974). At the Barranca Escondida, the Maya appear to have conducted rituals involving the intentional smashing of greenstone artifacts and associated objects.

PYRITE ARTIFACTS AND MIRROR BACKS

Pyrite artifacts and mirror backs were analyzed by Marcelo Zamora (Zamora Mejía 2002) and Takeshi Inomata (Figures 6.16–6.28). Pyrite is a mineral consisting of iron disulfide (FeS_2). There are known sources in the departments of Huehuetenango, Quiche, and Alta Verapaz in the Guatemalan highlands (Kesler and Ascarrunz-K. 1973; Petersen and Zantop 1980), but it is not clear whether the pyrite pieces found at Aguateca came from those highland sources.

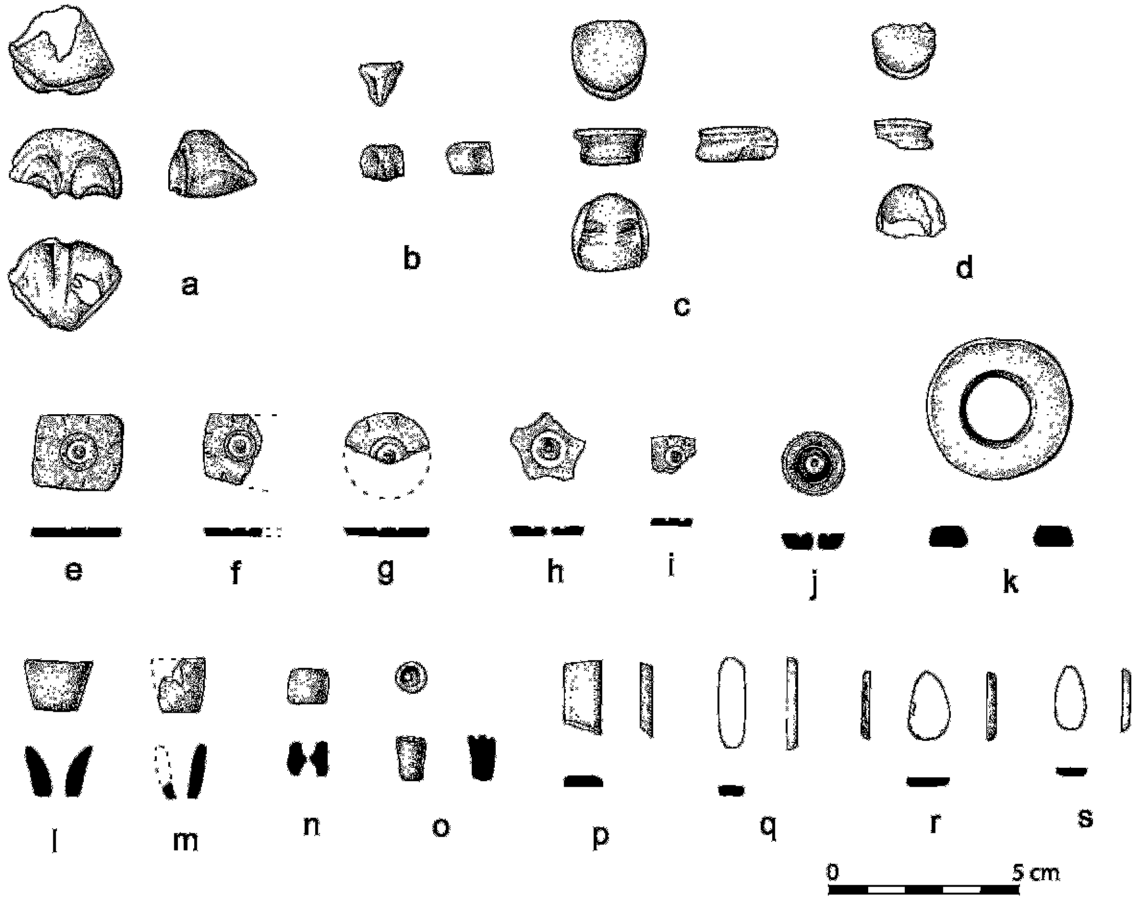


Figure 6.16. Pyrite ornaments. (a–d) Three-dimensional composite ornament possibly representing a bird. (a) 23A19-3-3, Cat. 1851-1. (b) 23A19-3-1, Cat. 1509-2. (c) 23A19-3-1, Cat. 1852-1. (d) 23A19-3-1, Cat. 1509-1. (e–i) Carved plaques. (e) 23A7-3-1, Cat. 814-1. (f) 23A35-3-3, Cat. 384-1. (g) 21A83-2-1, Cat. 1017-1. (h) 23A1-3-2, Cat. 932-1. (i) 23A10-3-4, Cat. 785-1. (j) Button-shaped. 23A43-3-5, Cat. 1645-1. (k) Ring. 20A5-1-1, Cat. 116-1. (l–n) Beads. (l) 22A12-3-1, Cat. 859-1. (m) 22B38-3-1, Cat. 582-1. (n) 22B13-3-1, Cat. 495-1. (o) Three-dimensional shape. 21A40-3-4, Cat. 589-2. (p–s) Plaques. (p) 22A9-2-2, Cat. 138-2. (q) 21A40-3-4, Cat. 589-1. (r) 23A29-1-1, Cat. 187-2. (s) 23A43-3-4, Cat. 1358-1.

Classification of Pyrite Pieces

Pyrite pieces include the following categories: (1) nodules, (2) pieces with three-dimensional shapes, (3) plaques other than mirror mosaic pieces, (4) mirror mosaic pieces, and (5) rectangular ornaments reworked from mosaic pieces (Table 6.3).

The first category includes worked and unworked nodules of pyrite (Figure 6.17a'–f'). Most of them are unworked and exhibit the cubic shapes of pyrite crystals. The small sizes of these nodules, measuring less than 2 cm in diameter, do not appear to be adequate for the production of mosaic pieces, and they may have been discarded or may have remained unused for this reason. Cat. 22A2042-1, however, is substantially larger than the others, measuring 5.8 × 3.4 × 0.7 cm (Figure 6.17f'). Although its surface retained the cubic shapes of pyrite crystals, it may have been prepared as this flat shape for the production of a mosaic piece.

The second category includes conical beads, cylindrical beads, and other three-dimensional forms that are generally thicker and three-dimensionally more complex than mosaic pieces and plaques. Only two examples of conical beads were found, both from possible termination rituals (Cat. 22A859-1 and 22B582-1) (Figures 6.16l–m, 6.17n). An example found during the Petexbatun Project in Structure M8-10 was probably used with a circular pyrite plaque with a perforation at the center (Inomata 1995:765, Figure 8.47c). The specimens from Operations 22A and 22B may have been used in a similar manner. The total of ten cylindrical beads was found in Operations 22A, 22B, and 23A (Figures 6.16n, 6.17s–z). They may have formed strung ornaments with greenstone or shell beads. A piece from

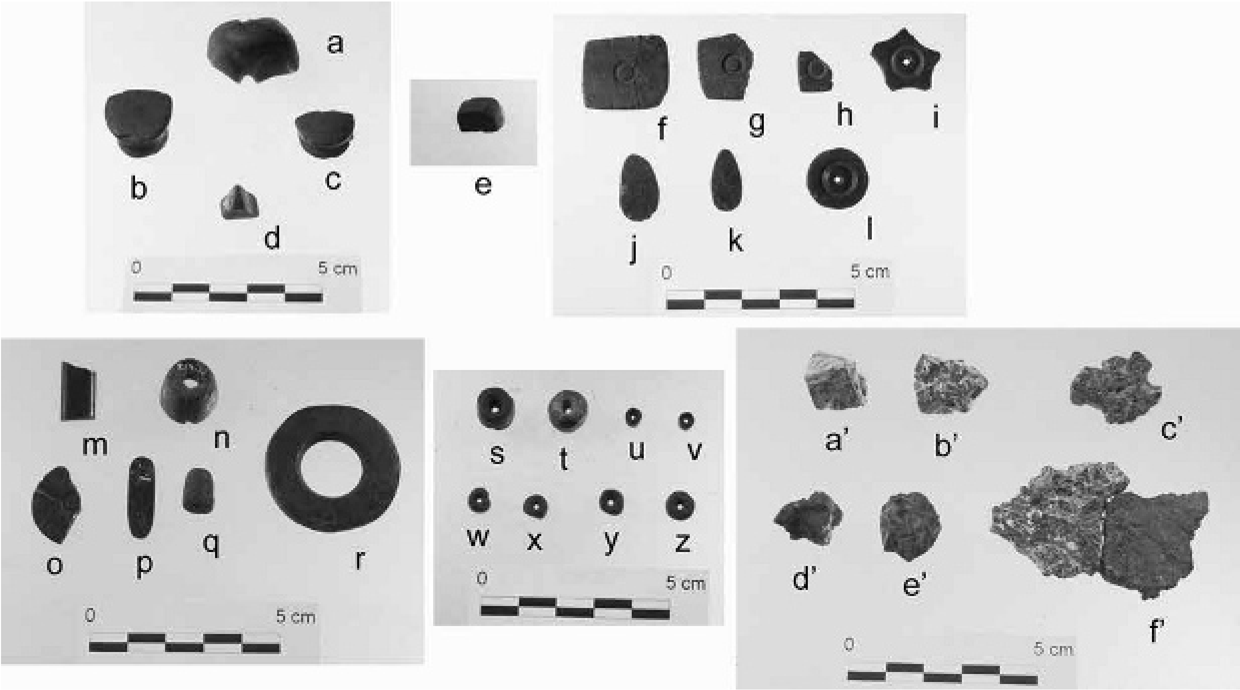


Figure 6.17. Pyrite ornaments and nodules. (a–e) Three-dimensional shapes. (a) 23A19-3-3, Cat. 1851-1. (b) 23A19-3-1, Cat. 1852-1. (c) 23A19-3-1, Cat. 1509-1. (d) 23A19-3-1, Cat. 1509-2. (e) 23A44-3-3, Cat. 2157-1. (f–l) Plaques and a button-shaped ornament from Structure M8-4. (f) 23A7-3-1, Cat. 814-1. (g) 23A35-3-3, Cat. 384-1. (h) 23A10-3-4, Cat. 785-1. (i) 23A1-3-2, Cat. 932-1. (j) 23A29-1-1, Cat. 187-2. (k) 23A43-3-4, Cat. 1358-1. (l) 23A43-3-5, Cat. 1645-1. (m–r) Ornaments from Structures M7-22, M8-8, and M7-34. (m) 22A9-2-2, Cat. 138-2. (n) 22A12-3-1, Cat. 859-1. (o) 21A83-2-1, Cat. 1017-1. (p) 21A40-3-4, Cat. 589-1. (q) 21A40-3-4, Cat. 589-2. (r) 20A5-1-1, Cat. 116-1. (s–z) Beads. (s) 22B42-3-3, Cat. 745-1. (t) 22B13-3-1, Cat. 495-1. (u) 23A18-3-4, Cat. 1663-1. (v) 23A18-3-4, Cat. 2051-1. (w–x) 22A49-3-1, Cat. 2128. (y–z) 22A45-3-1, Cat. 2127. (a'–f') Unworked nodules. (a') 22B40-2-1, 365-1. (b') 22B38-2-3, Cat. 313-1. (c') 22A24-2-2, Cat. 2121-1. (d') 23A9-3-2, Cat. 656-1. (e') 23A2-1-1, Cat. 103-1. (f') 22A8-2-3, Cat. 2042-1.

Operation 21A (Cat. 589-2) may have been a cylindrical bead with an unfinished perforation that was used for other purposes (Figures 6.16o, 6.17q). Three-dimensional forms include four pieces from Operation 23A (Figures 6.16a–d, 6.17a–d). Cat. 1851-1 and 1509-2 appear to have made the face of an owl. The other two pieces (Cat. 1852-1 and 1509-1) were probably parts of the same ornamental object. The nature of two small three-dimensional pieces (Cat. 22B582-2 and 23A2157-1) is not clear (Figure 6.17e).

The third category includes quadrangular plaques, circular plaques, oval plaques, rings, and star-shaped plaques. Like mirror mosaic pieces, they are well polished on one side but the other sides remain rough. Most of them have thicknesses similar to mirror mosaic pieces (2–3 mm). A rectangular plaque without incisions or perforations was found in Operation 22A (Cat. 138-2) (Figures 6.16p, 6.17m). Its two long sides have rounded upper edges. Three other quadrangular plaques (Cat. 23A348-1, 785-1, and 814-1) come from the south room of Structure M8-4 (Figures 6.16, 6.17). They all have a circular incision in the center and radiating incisions along the edges. They do not have perforations and may have been glued to larger objects. Cat. 348-1 and 814-1, found in the front part of the room, have similar sizes and shapes and may have been used as a pair. Cat. 785-1, from the rear part of the room, is smaller and appears to have been part of a different ornament. A circular plaque without perforation from Structure M7-34 (Cat. 21A1017-1) has circular and radiating incisions similar to the quadrangular pieces (Figures 6.16g, 6.17o). Two plaques from the north room of Structure M8-4 with star-like and circular shapes (Cat. 23A932-1 and 23A1645-1) have perforations in the center and circular incisions around them (Figures 6.16h, 6.17i). A large, thick ring (Cat. 20A116-1) was found in Structure M8-8 (Figures 6.16k, 6.17r). Three oval plaques (Cat. 21A589-1, 23A187-2, and 23A1358-1) do not have incisions or perforations (Figures 6.16q–s; 6.17j, k, p).

A large portion of the pyrite pieces belong to the fourth category, mirror mosaic pieces (Figures 6.18–6.20). They were well polished on one side, and they probably

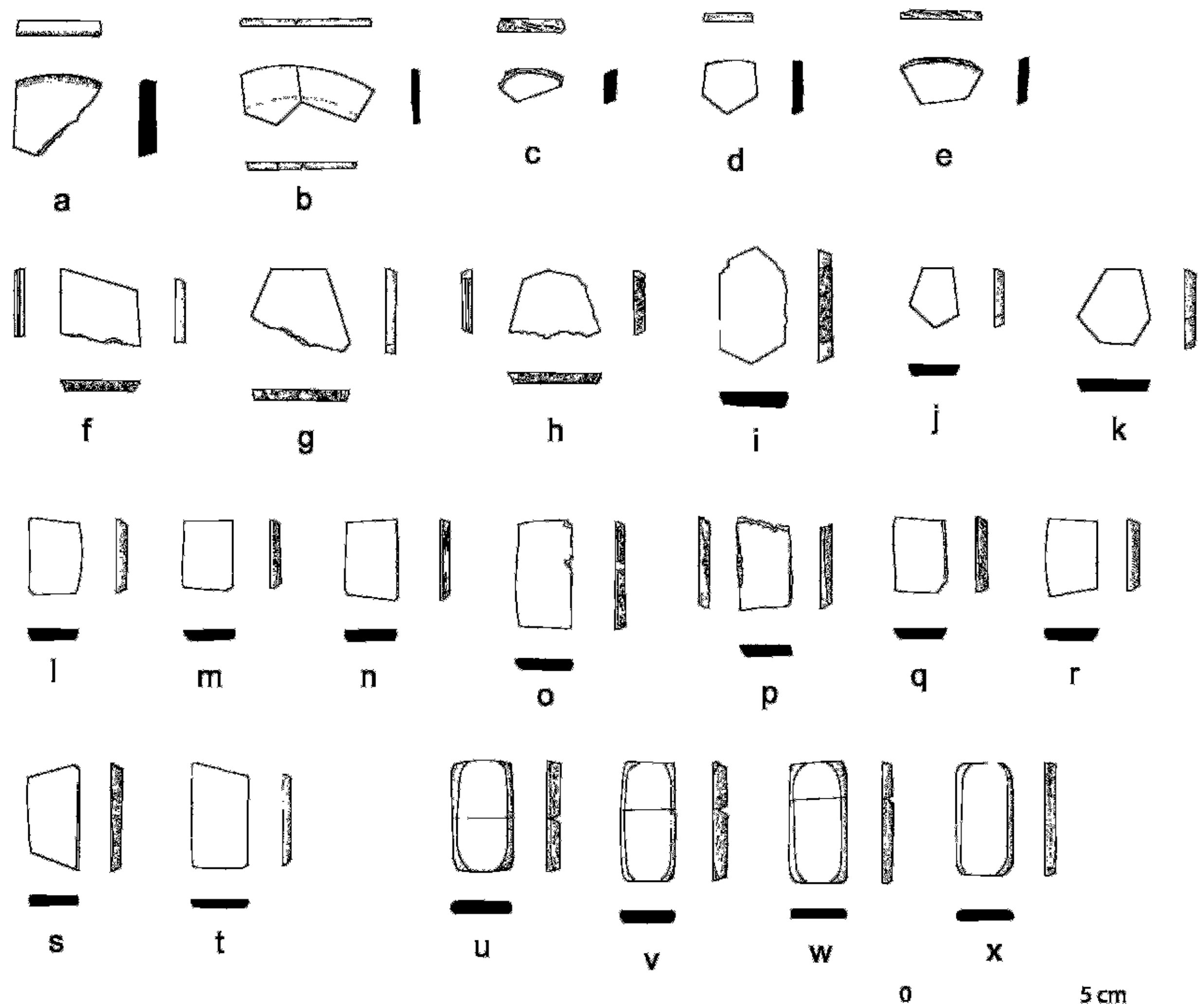


Figure 6.18. Pyrite mosaic mirror pieces and recycled artifacts. (a–e) Round mirror edge pieces. (a) 14D1-3-1, Cat. 115-1. (b) 22A10-3-2, Cat. 797. (c) 22A10-2-6, Cat. 528-3. (d) 22A10-2-6, Cat. 498-1. (e) 22A10-3-1, Cat. 800-1. (f–i) Broken mosaic mirror fragments. (f–h) 22A49-3-1, Cat. 1059. (i) 23A5-2-1, Cat. 277. (j–k) Mosaic mirror pieces. (j) 22A9-2-2, Cat. 138. (k) 23A29-1-1, Cat. 187. (l–t) Mosaic pieces in process of reworking found in Structure M8-4. (l–p) Long edges cut and in process of polishing. (l) 23A5-3-1, Cat. 501-1. (m) 23A5-3-1, Cat. 502-1. (n–o) 23A5-3-1, Cat. 794. (p) 23A26-3-2, Cat. 588-1. (q–s) Long edges cut and polished. 23A5-3-1, Cat. 794. (t) Two long edges and one short edge cut and polished. 23A5-2-1, Cat. 277. (u–x) Finished rectangular ornaments recycled from mosaic pieces. 23A5-3-1, Cat. 795.

shined and reflected images before they were oxidized. Most burned and broken plaques that could not be assigned to specific artifact types were probably mirror mosaic pieces. The sides of mosaic pieces were usually beveled in, and the upper surfaces left hardly any space between adjacent pieces when they were placed on mirror backs. Pieces that formed edges of mirrors can be identified because they do not have sharp-angled, beveled-in sides. The dimensions of mosaic pieces range from roughly 1 × 1 cm to 5 × 5 cm. Their dimensions were probably conditioned by the original sizes of the pyrite nodules. Most pieces measure 1.9 to 3.4 cm in thickness. Among the pieces attached to a mirror base, there exist differences in thickness up to about 1 mm. To obtain an even surface for a mirror, artisans probably adjusted the discrepancies in the thickness of mosaic pieces by applying different amounts of gluing materials.

A piece from Structure M8-4 (Cat. 23A181-1) is similar to other mosaic pieces but has unpolished edges, still showing traces of cutting and snapping (Figure 6.19m). Its patterns of cutting are substantially different from those of the recycled pieces discussed below. It appears that this was an unfinished mosaic mirror piece. Because we did not find any other evidence of mosaic mirror production in

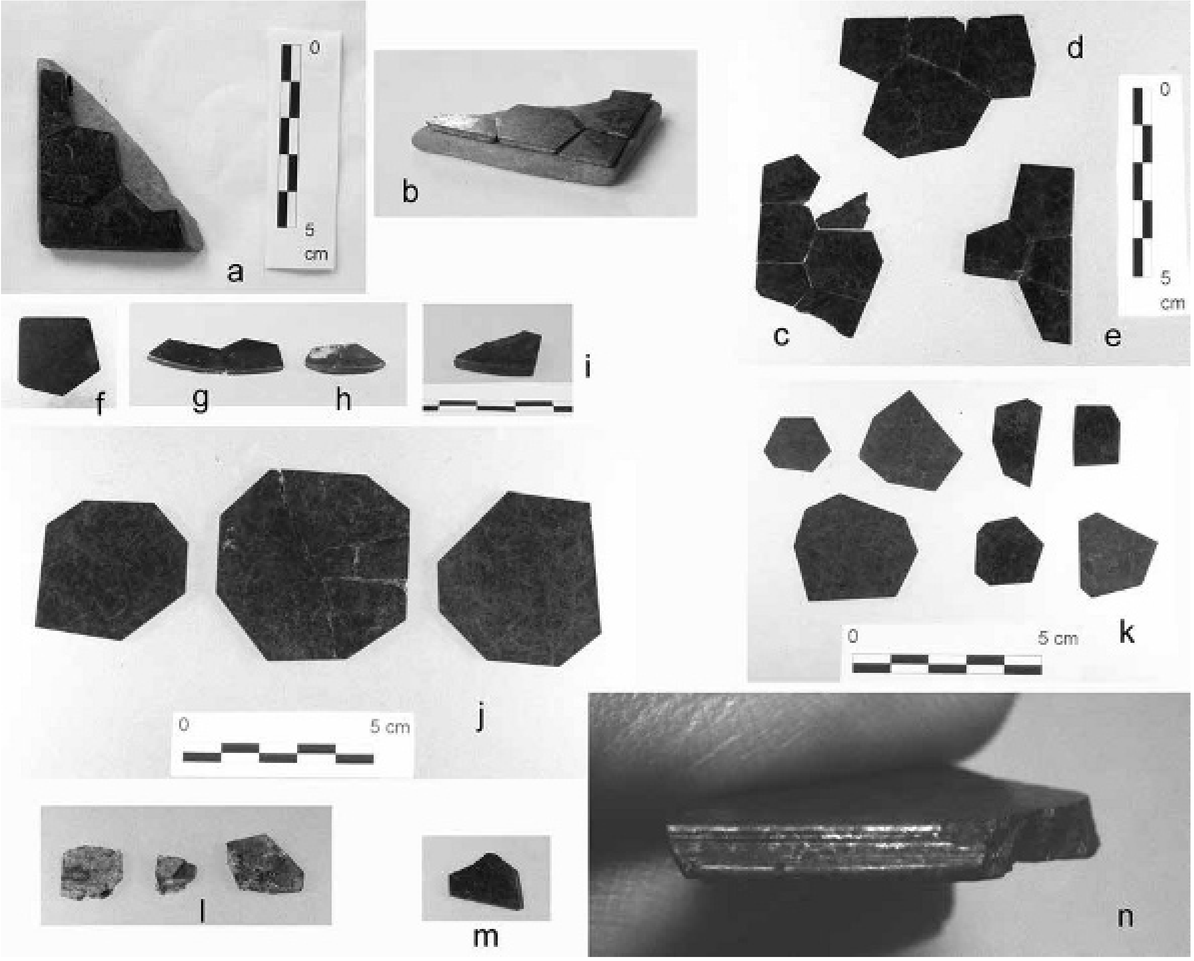


FIGURE 6.19. Pyrite mirror pieces. (a–b) Sandstone mirror back with pyrite pieces found with it. 20A3-3-2, Cat. 509-1. (c–e) Mosaic mirror straight edge pieces. (c) 23A29-3-4, Cat. 669. (d) 23A29-3-2, Cat. 770. (e) 23A7-3-3, Cat. 727. (f) Corner piece. 23A7-3-3, Cat. 396-1. (g–i) Round edge pieces. (g) 22A10-3-2, Cat. 797. (h) 22A10-3-1, Cat. 800-1. (i) 14D1-3-1, Cat. 115-1. (j–k) Mosaic mirror interior pieces. (j) 23A8-3-1, Cat. 380-1; 23A29-3-1, Cat. 563-1; 23A29-3-4, Cat. 668-1. (k) 23A27-1-1, Cat. 213. (l) Burned or oxidized pieces. 22A10-2-6, Cat. 528. (m) Unfinished mosaic piece. 23A31-1-1, Cat. 181-1. (n) Close-up view of the unfinished edge of Cat. 23A181-1.

this building, it is unlikely that this piece was originally worked there. It was probably brought to this structure and used for other purposes.

The fifth category consists of possible ornaments reworked from mirror mosaic pieces and found in the south room of Structure M8-4 (Figures 6.18l–x, 6.20). A significant number of the pieces were in the process of being reworked, exhibiting snapped, unpolished edges. The final products were ornaments of rectangular shape with rounded corners. In many cases, artisans used two adjoining mosaic pieces to form a rectangular shape.

Mirror Backs

In terms of shape, 29 recovered mirror backs are divided into round and quadrangular types (Figures 6.19a, 6.21–6.28; Table 6.4). Many of them are made of ceramics or sandstone, but one example is of limestone. Round mirror backs measure less than 9 cm in diameter and less than 1 cm in thickness. They were probably worn as ornaments. Many of them have two to four perforations, but two do not have any. All quadrangular mirror backs are fragmentary.

In some cases (Cat. 22A811-1, 22B378-1, 23A425-1, 23A706-1, 23A969-1, and 20A509-1), pyrite pieces were found on the surfaces of the mirror backs, but the adhesive materials appear to have disintegrated. Only Cat. 22B452-1 (Figure 6.24n) has a pyrite piece firmly glued to it. Keochakian (2001) analyzed its adhesive through X-ray diffraction, Fourier transform infrared spectroscopy, scanning electron microscopy, and other methods. She identi-

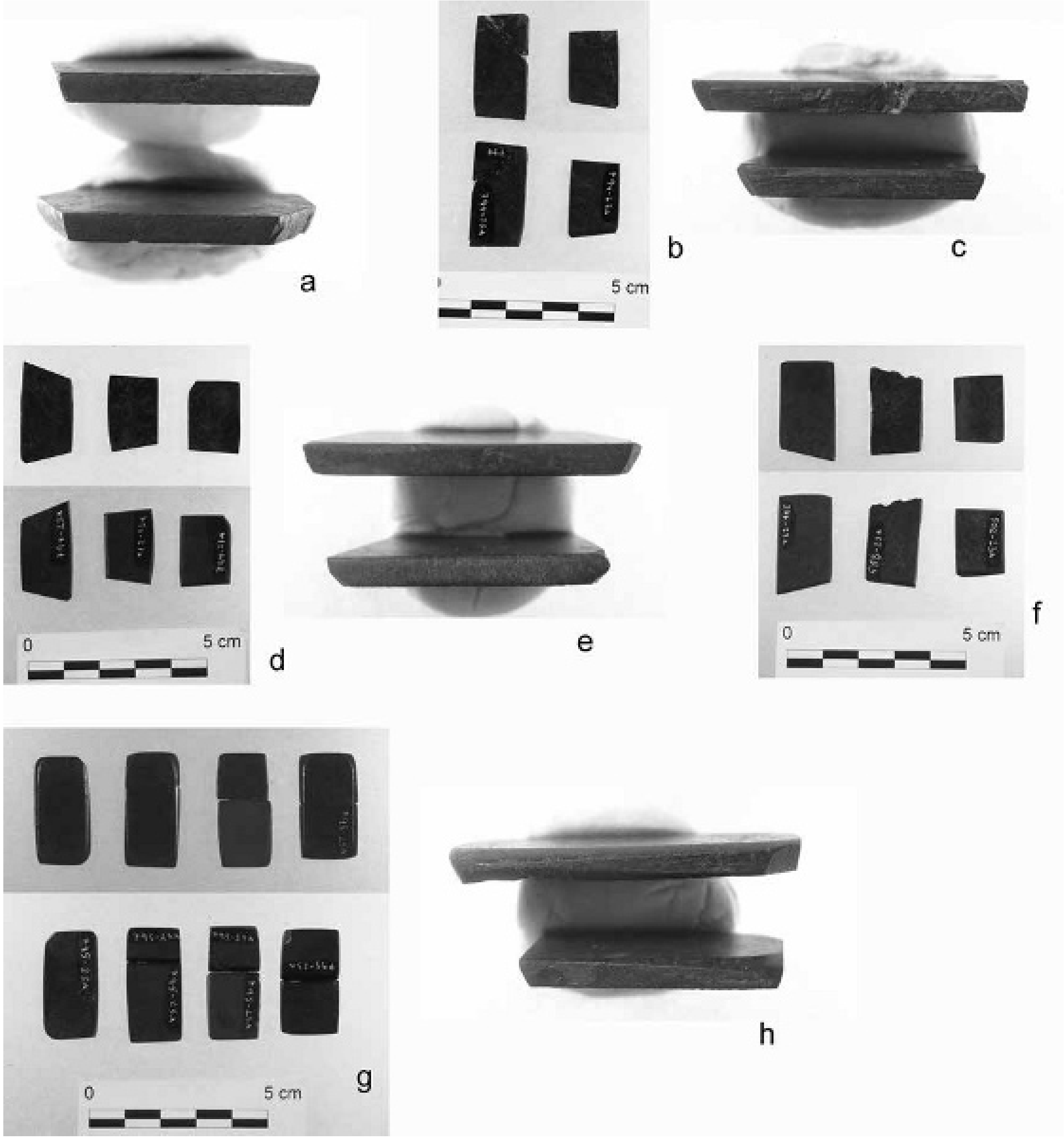


Figure 6.20. Reworking process of mosaic mirror pieces from Structure M8-4. (a) Edges of original mosaic pieces before being reworked. (b) Two long edges were cut and snapped but not polished or partially polished. 23A5-3-1, Cat. 794. (c) Close-up view of unpolished and partially polished edges. (d) Two long edges were polished. 23A5-3-1, Cat. 794. (e) Close-up view of polished edges. (f) Shorter edges were cut or ground to rectangular shapes. 23A5-2-1, Cat. 277; 23A26-3-2, Cat. 588-1; 23A5-3-1, Cat. 502. (g) Finished ornaments with rounded edges and corners. 23A5-3-1, Cat. 795. (h) Close-up view of rounded edges.

fied calcite ($CaCO_3$) and concluded that lime plaster or stucco was used as the adhesive. She also analyzed possible remains of adhesives on Cat. 23A425-1, but the result was inconclusive.

Discussion

Many of the pyrite pieces and mirror backs were concentrated in Structures M7-22 and M8-4. A considerable number were found in the termination ritual deposits in and around Structures M7-22 and M7-32, distinguishing them from common middens. The nine complete or reconstructible round mirror backs with associated pyrite pieces found in the easternmost room of Structure M7-22 were probably part of the royal possessions. Although mineral pyrite generally has a golden color, all archaeological samples from Aguateca were oxidized into a dark red color due to exposure to the atmosphere and moisture. Moreover, a considerable number of pieces were

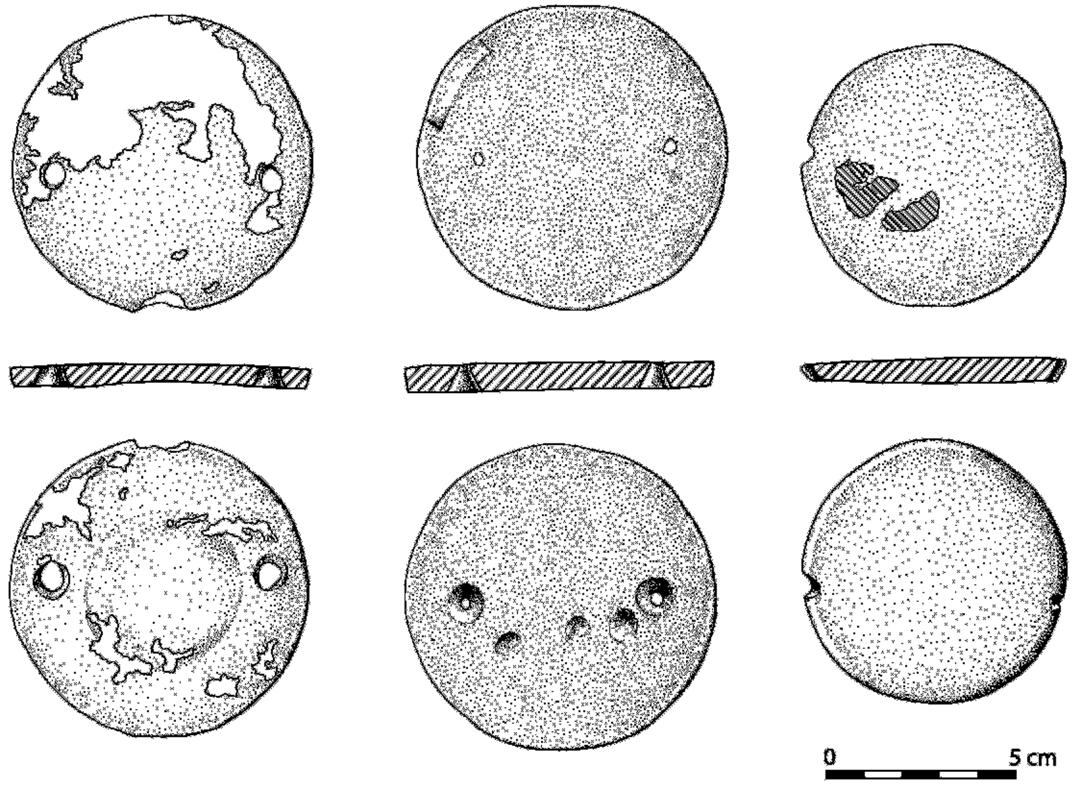


FIGURE 6.21. Mirror backs from the easternmost room of Structure M7-22. Left: Ceramic. 22A10-3-3, Cat. 779-1. Center: Ceramic. 22A10-2-6, Cat. 493-1. Right: Ceramic. 22A10-3-2, Cat. 769-1.

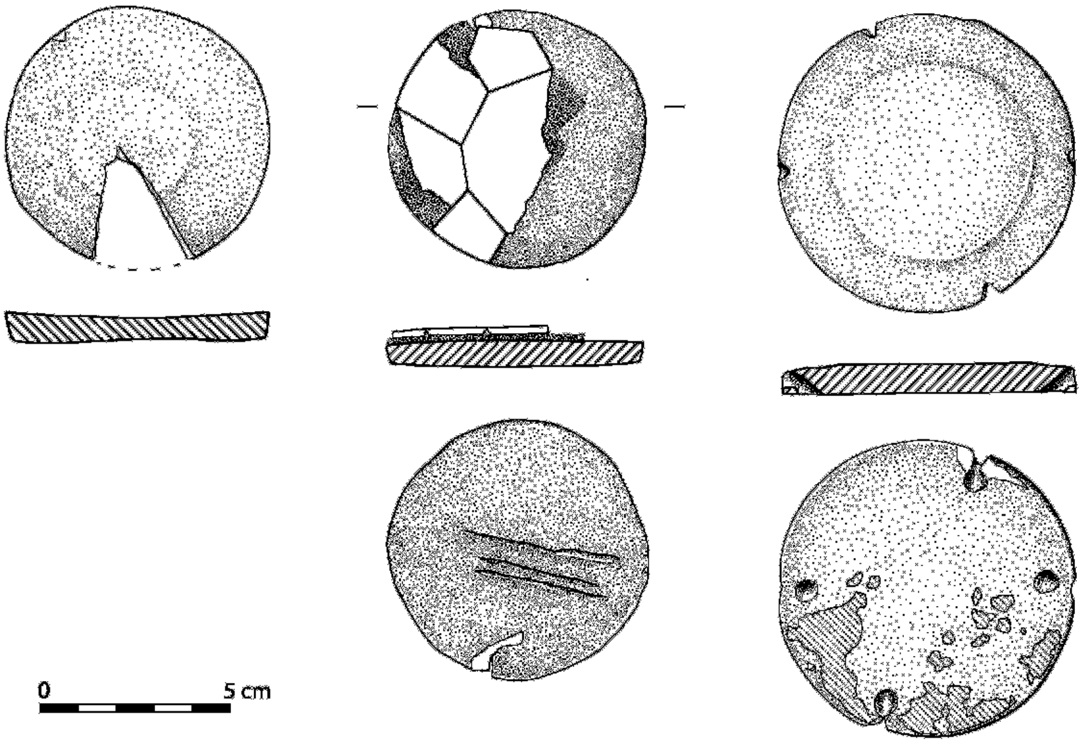


FIGURE 6.22. Mirror backs from the easternmost room of Structure M7-22. Left: Ceramic. 22A10-3-2, Cat. 771-1. Center: Ceramic. Some pyrite mosaic pieces were found with it. 22A10-3-1, Cat. 811-1. Right: Sandstone. 22A10-2-6, Cat. 517-1.

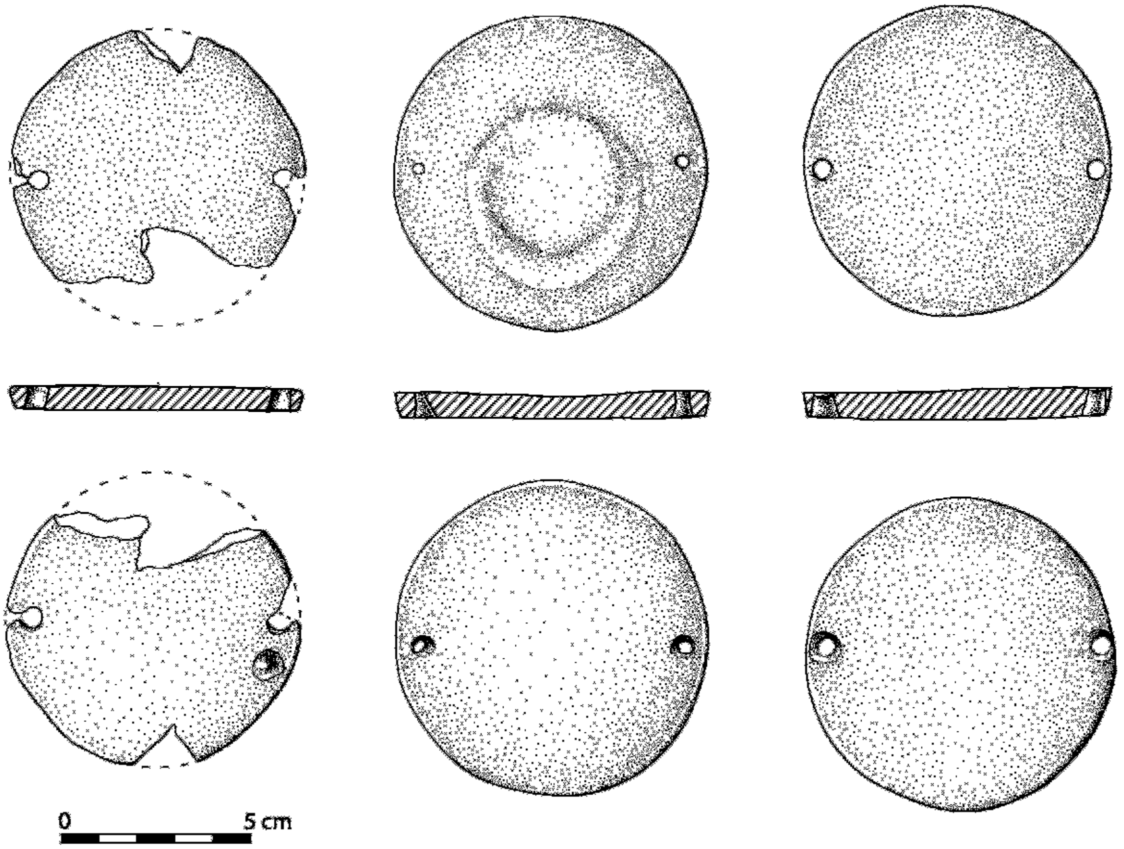


Figure 6.23. Mirror backs from the easternmost room of Structure M7-22. Left: Sandstone. 22A10-3-2, Cat. 833-1. Center: Ceramic. 22A10-2-6, Cat. 495-1. Right: Ceramic. 22A10-2-6, Cat. 494-1.

deformed, most likely as an effect of burning. Pyrite decomposes into iron sulfide (FeS) starting at 550°C, releasing sulfur (Luganov and Shabalin 1982). The high ratio of deformed pyrite pieces in the easternmost room of Structure M7-22 indicates that burning was particularly intense in this area.

Round shapes, like those found in the easternmost room of Structure M7-22, are the most common among the known examples of pyrite mirrors from the Maya area, including those from Altar de Sacrificios (Willey 1972: Figure 125), Altun Ha (Pendergast 1990:Figure 13g), Barton Ramie (Willey et al. 1965:Figure 295), Chichen Itza (Moholy-Nagy and Ladd 1992:Figures 5.5–5.7), Piedras Negras (Coe 1959:Figure 42f), San José (Thompson 1939: Plate 28b), Baking Pot (Ricketson 1929:17), Pacbitun (Healy 1990:Figure 8), Palenque (Ruz Lhuillier 1958: Plates 46, 52), and San Agustín Acasaguastlan (Smith and Kidder 1943:Figure 57), as well as from the highland sites of Nebaj (Smith and Kidder 1951:44–50) and Zaculeu (Woodbury and Trik 1953:Figures 130–132) (see Zamora 2002; Kovacevich 2006:229–246; and Blainey 2007 for more thorough reviews). The discovery of more than 200 round pyrite mirrors at Nebaj (Smith and Kidder 1951:44–50), located in the pyrite-bearing zone, suggests that this site or nearby areas were important centers for the production of pyrite artifacts. Many of the Nebaj examples fall into two ranges of sizes: 8–10 cm or 12–15 cm in diameter (Smith and Kidder 1951:45). The round mirror backs from Aguateca mostly correspond to the first category, but some are even smaller. Round mirror backs from Nebaj and Aguateca commonly have two or four conical perforations, suggesting that they were used in comparable manners. However, their materials are different. The Nebaj objects are described as slate or mudstone and those from another highland site, Kaminaljuyu, as slate or shale (Kidder et al. 1946:126), although Healy and Blainey (2011:230) suggest that most were made of slate. The Aguateca examples, however, are made of ceramic, sandstone, and limestone. In this regard, the pyrite mirrors found at Aguateca are more similar to those from the pyrite workshops identified at Cancuen, where pyrite pieces in various stages of manufacture were found with

TABLE 6.4. Mirror Backs.

LOT	CATALOG NO.	MATERIAL	FORM	CONDITION	MOSAIC PIECES ATTACHED	LENGTH (cm)	WIDTH (cm)	DIAMETER (cm)	THICKNESS (cm)	FEATURES
22A10-2-6	493-1	ceramic	round	complete	N			8.2	0.7	2 perforations
22A10-2-6	517-1	sandstone	round	complete	N			7.7	0.7	4 perforations
22A10-2-6	494-1	ceramic	round	complete	N			8.0	0.7	2 perforations
22A10-2-6	495-1	ceramic	round	complete	N			8.9	0.6	2 perforations
22A10-3-1	811-1	ceramic	round	complete	Y			6.7	0.5	no perforations
22A10-3-2	771-1	ceramic	round	almost complete	N			7.0	0.6	no perforations
22A10-3-2	769-1	ceramic	round	complete	N			6.8	0.6	2 notches on the edge, not perforations
22A10-3-2	833-1	sandstone	round	reconstructible	N	7.5	5.7		0.6	probably 2 perforations
22A10-3-3	779-1	ceramic	round	complete	N			7.8	0.6	2 perforations
22A45-3-1	2055-1	limestone	round	fragment	N	2.7	2.1		0.6	1 or more perforations, groove on the edge
22A9-3-4	2063-1	ceramic	quadrangular	fragment	N	4.6	3.5		0.9	incision on the edge
22B13-3-1	500-1	ceramic	round	fragment	N			27.0	0.5	1 or more perforations
22B38-3-1	581-1	ceramic	round	fragment	N			7.0	0.6	no perforations
22B42-2-3	378-1	sandstone	quadrangular	fragment	Y	7.8	6.1			
22B42-3-1	452-1	sandstone	undetermined	fragment	Y	2.7	1.9		1.0	
20A3-3-2	509-1	ceramic	quadrangular	fragment	Y	5.1	4.5		0.6	
23A4-3-3	969-1	sandstone	quadrangular	partial	Y	7.8	6.7		1.2	2 biconical perforations, a hole that does not go through
23A5-3-2	466-1	ceramic	quadrangular	fragment	N	4.3	4.2		1.3	
23A6-3-2	415-1	sandstone	undetermined	fragment	N	6.5	2.0		1.0	
23A6-3-2	706-1	ceramic	round	complete	Y			7.6	0.6	
23A6-3-4	425-1	sandstone	quadrangular	partial	Y	12.5	12.0		1.2	2 biconical perforations, 2 holes that do not go through
23A8-3-2	389-1	ceramic	undetermined	fragment	N	8.2	7.9		0.8	
23A8-3-2	390-1	ceramic	undetermined	fragment	N	8.9	8.6		0.9	
23A8-3-4	388-1	sandstone	quadrangular	fragment	N	6.6	5.0		1.2	
23A29-3-4	596-1	sandstone	quadrangular	fragment	N	5.3	2.9		1.3	1 perforation
23A44-1-1	245-1	sandstone	quadrangular	fragment	N	4.2	3.8		1.2	
23A48-3-3	1688-1	sandstone	quadrangular	fragment	N	2.2	2.0		1.7	
23A49-2-1	1054-1	ceramic	quadrangular	fragment	N	8.3	4.6		0.9	
23A53-3-1	859-1	ceramic	quadrangular	partial	N	12.0	10.1		1.1	

Note: Length and width refer to dimensions of the present parts whereas diameter refers to those of the original artifacts.

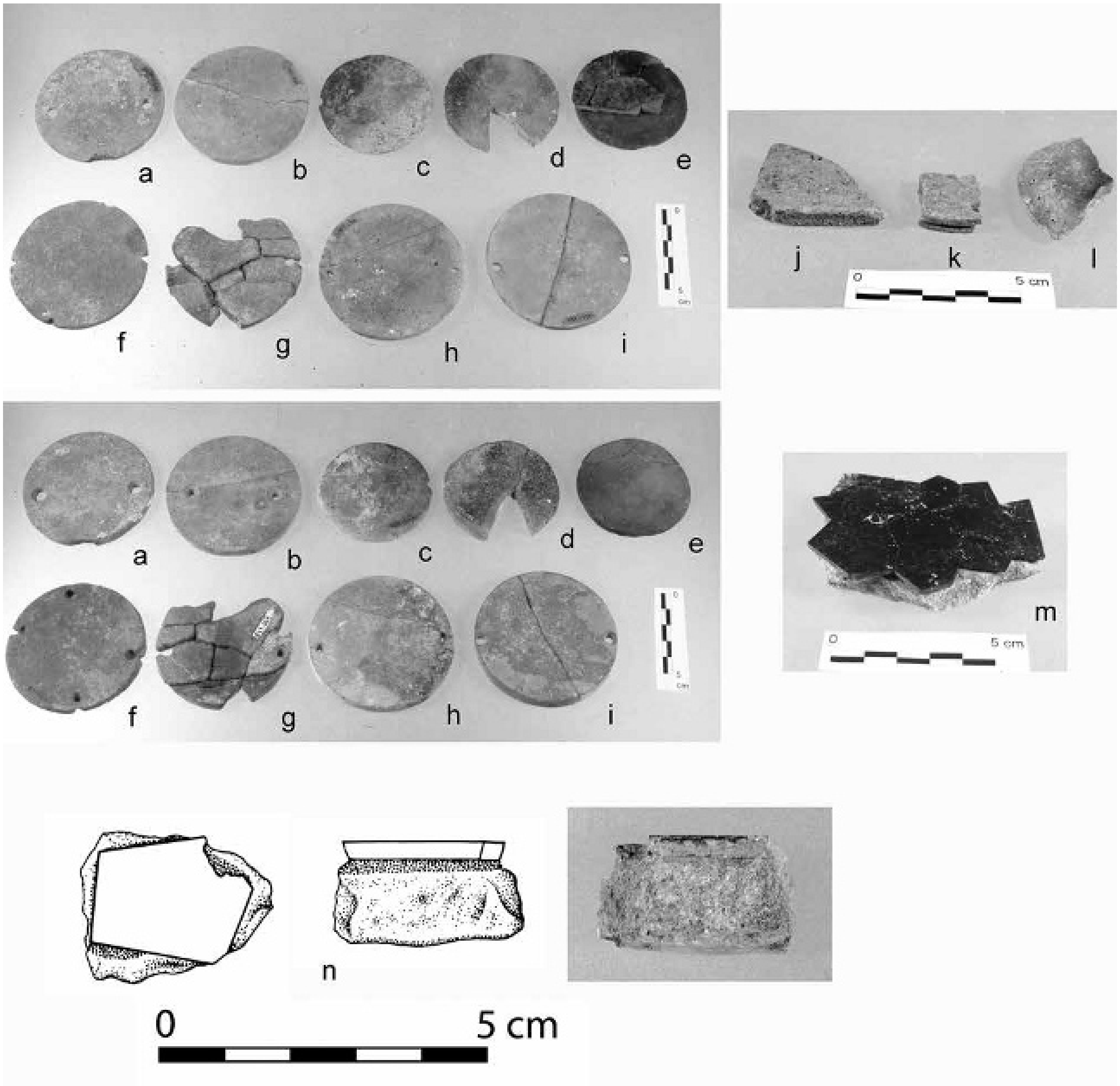


FIGURE 6.24. Mirror backs from Structures M7-22 and M7-32. (a–i) Round mirror backs from the easternmost room of Structure M7-22 (Operation 22A). See captions to Figures 6.15–6.17 for details. (¼ scale) (a) Cat. 779-1. (b) Cat. 493-1. (c) Cat. 769-1. (d) Cat. 771-1. (e) Cat. 811-1. (f) Cat. 517-1. (g) Cat. 833-1. (h) Cat. 495-1. (i) Cat. 494-1. (j–l) Fragments of mirror backs. (½ scale) (j) Ceramic. 22A9-3-4, Cat. 2063-1. (k) Limestone. 22A45-3-1, Cat. 2055-1. (l) Ceramic. 22B38-3-1, Cat. 581-1. (m) Sandstone. Pyrite pieces were found with it. (½ scale) 22B42-2-4, Cat. 378-1. (n) Sandstone mirror back with a pyrite piece still glued to it. (1/1 scale) 22B42-3-1, Cat. 452-1.

round mirror backs made of stone or ceramics (Kovacevich 2006:229–270).

Zamora (2002:16) and Kovacevich (2006:239–240) point out that mirrors may be worn on the forehead, as part of the headdress, or as pectorals, as shown in murals at Teotihuacan (Miller 1973:Figures 202, 210, 211). Alternatively, they may have been worn on the lower back. The use of round back mirrors, called *tezcacuitlapilli*, by Toltec and Aztec warriors is well known, and similar mirrors were used at Teotihuacan. Taube (1992b:75; 1983) points out that a ceramic effigy found in Tikal Burial 10, the possible tomb of Yax Nuun Ahiin, carries a round mirror on its back (Culbert 1993:Figure 14), and that this Tikal king, depicted as a Teotihuacan-style warrior on Stela 31, also wears a back mirror. In addition, multiple round mirrors were found at Kaminaljuyu in association with other

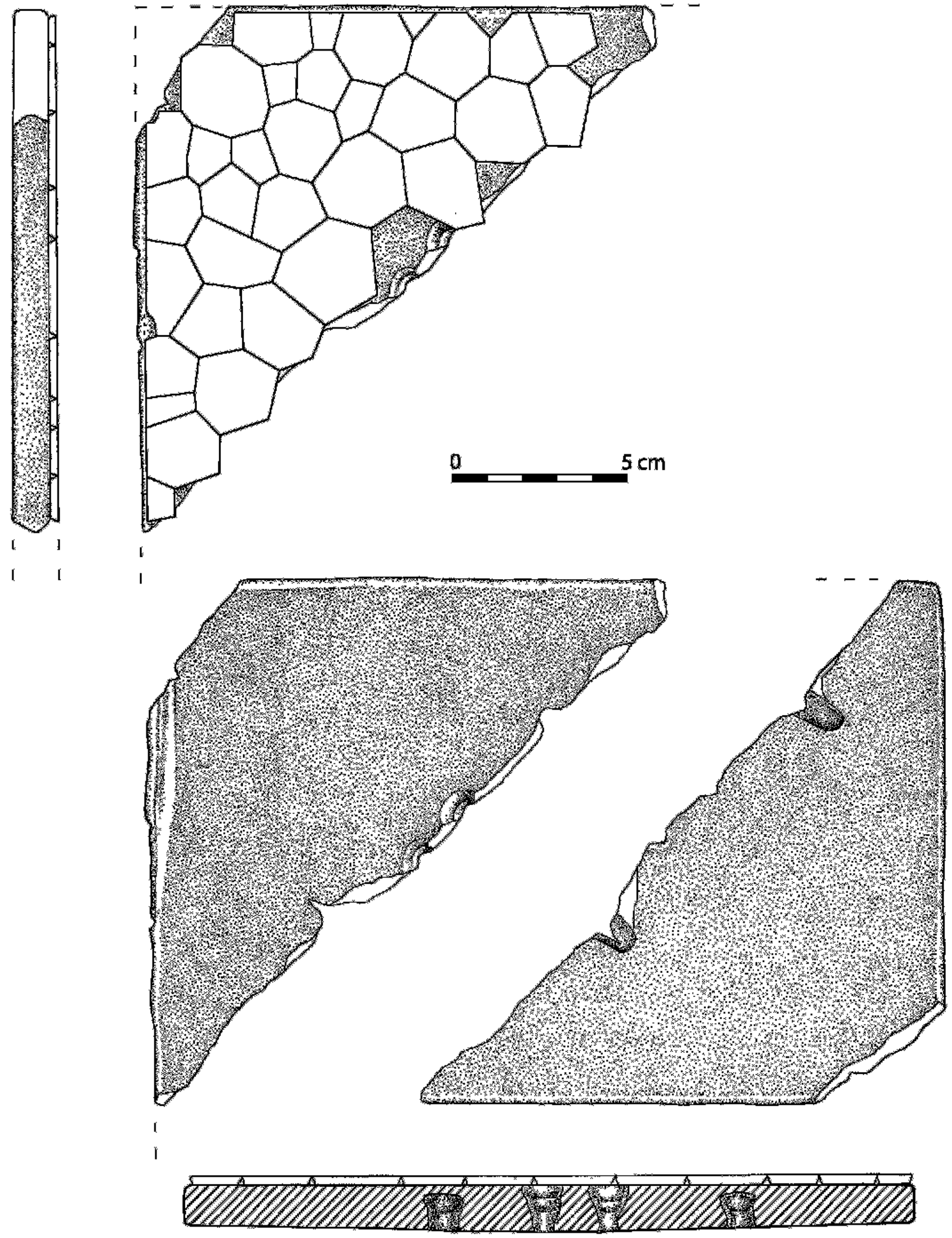


FIGURE 6.25. Sandstone mirror back from Structure M8-4 with pyrite pieces found with it. 23A6-3-4, Cat. 425-1.

Teotihuacan-style objects (Kidder et al. 1946:Figure 155). If the mirrors from Structure M7-22 were used as back mirrors, they probably represented war symbolism associated with Teotihuacan, although the Aguateca mirrors were used a few centuries after the fall of the central Mexican center (Taube 1992a).

In addition to their use as parts of ornaments or costumes, mirrors may have been tied to divination (Miller and Taube 1993:79), and some mirrors may have been held by wooden effigies (Taube 1992b:75) (see K1453). Moreover, they may have been used by elites for the practical purpose of viewing their reflection. Although some scholars resist this interpretation (Healy and Blainey 2011:241; Taube 1983:112–113), such use is suggested by various ceramic paintings of dressing scenes that commonly depict mirrors held by attendants for the rulers or other elites as they put on elaborate attire in preparation for public ceremonies (K764, K1454, K2695; Nelson et al. 2009).

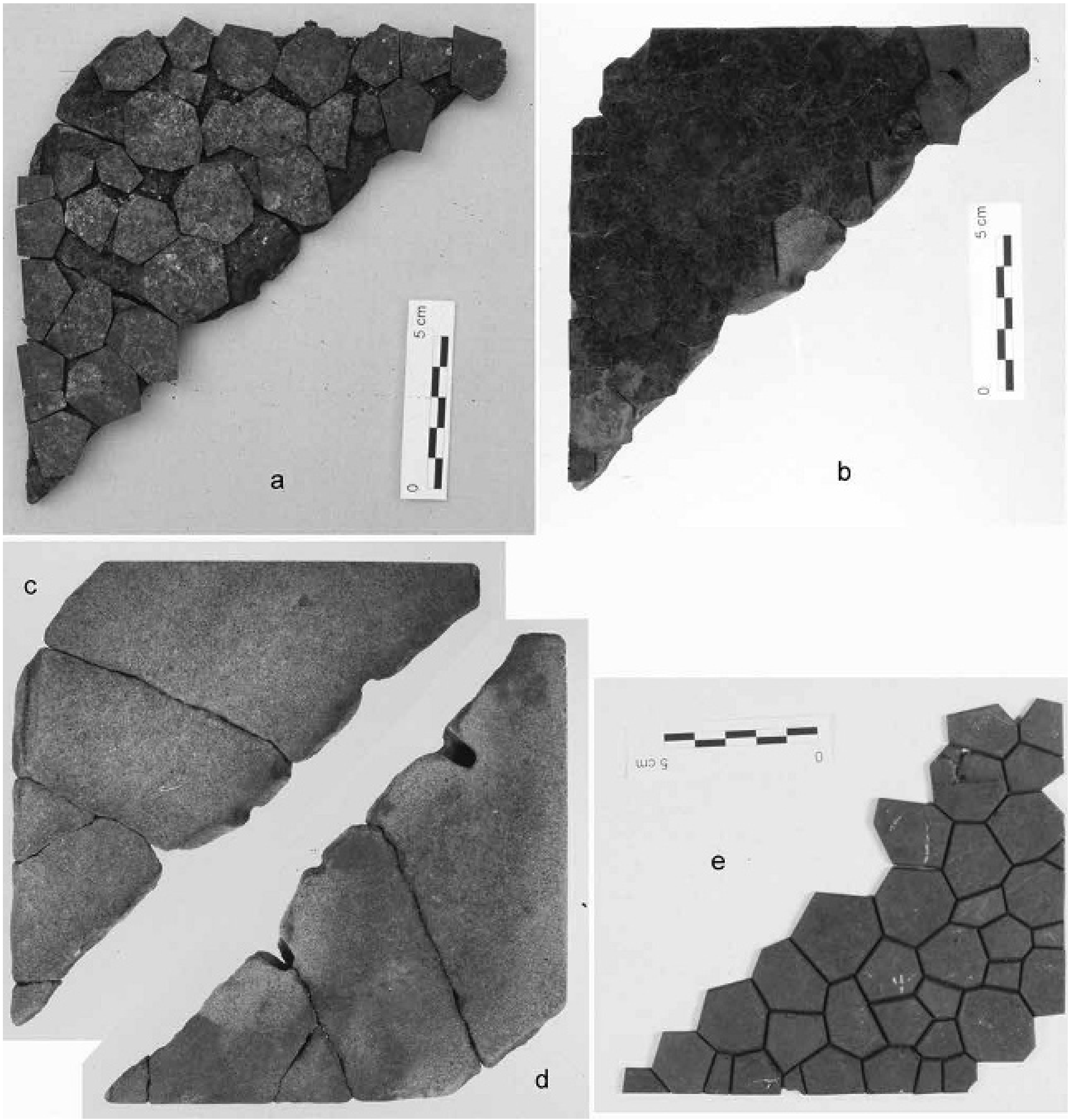


Figure 6.26. Sandstone mirror back from Structure M8-4 with pyrite pieces found with it. 23A6-3-4, Cat. 425-1. (a) After excavation. (b) After restoration. (c) Front side of the mirror back. (d) Back side of the mirror back. (e) Back side of the pyrite pieces after restoration.

A large number of pyrite artifacts were found in the south room and on the south side of Structure M8-4. They were most likely associated with the production of pyrite ornaments from mosaic pieces. All the stages of reworking were represented by the excavated samples. The manufacturer first made incisions on mosaic pieces and then snapped them along the incisions to make two longer sides of rectangular pieces. The snapped sides were then polished. Finally, the manufacturer cut or polished the shorter sides of the rectangle and further polished the longer sides to give them rounded edges. When the mirror mosaic parts were not large enough to make a rectangular shape, two pieces were combined. Significantly, the Jester God diadem was found on the bench of the south room

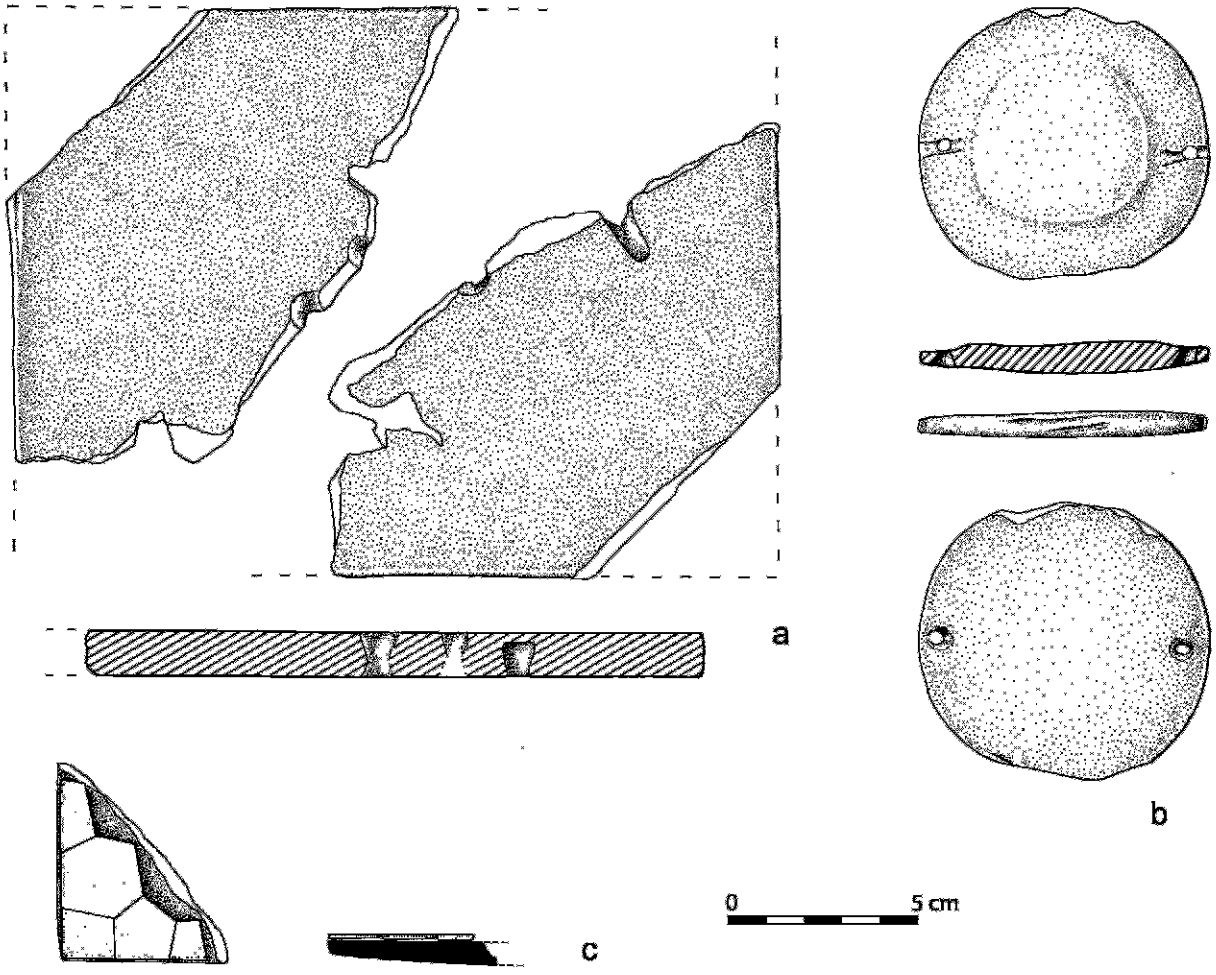


Figure 6.27. Mirror backs from Structures M8-4 and M8-8. (a) Sandstone. 23A4-3-3, Cat. 969-1. (b) Ceramic. 23A6-3-2, Cat. 706-1. (c) Sandstone. With pyrite pieces found with it. 20A3-3-2, Cat. 509-1.

amid the highest concentration of recycled pyrite pieces. These pyrite ornaments were probably parts of headdresses or other attire meant to be used with the Jester God headband. These ornaments exhibit some similarities to the pyrite plaques possibly used for headbands found in Burial 5 of Piedras Negras (Coe 1959:43, Figure 42g). It is notable that the excavators of Structure M8-4 did not find any debitage from pyrite working, and soil analysis showed that the level of iron was relatively low in the south room. There was a high iron concentration outside the excavated area. It is probable that the artisan worked on pyrite outside the building and brought back unfinished pieces to the room at the end of the day.

Structure M8-4 contained at least 13 mirror backs, some of them of substantial size. Except for the round mirror back (Cat. 23A706-1), they were not complete. It appears that the artisan of this building collected broken mirrors specifically to recycle them and to produce ornaments.

We should also note that 13 pyrite pieces, many of them nodules or three-dimensional shapes, were found in the north room of this building. There were significantly fewer pyrite artifacts in other buildings and areas, usually single or a few isolated pieces. Structure M8-8 contained a small fragment of a mirror back with pyrite pieces still attached to it (Figure 6.19a). The piece from Operation 14D (Cat. 115-1) is thicker than most other pieces, measuring 4.2 cm, indicating that it did not come from the mosaic mirrors found in Structure M7-22 or M8-4. Five of the seven pyrite pieces found in Structure M8-8 were attached to a fragmentary mirror back.

This highly skewed distribution of pyrite pieces and mirror backs suggests that access to these items was exceedingly restricted, mainly enjoyed by members of the

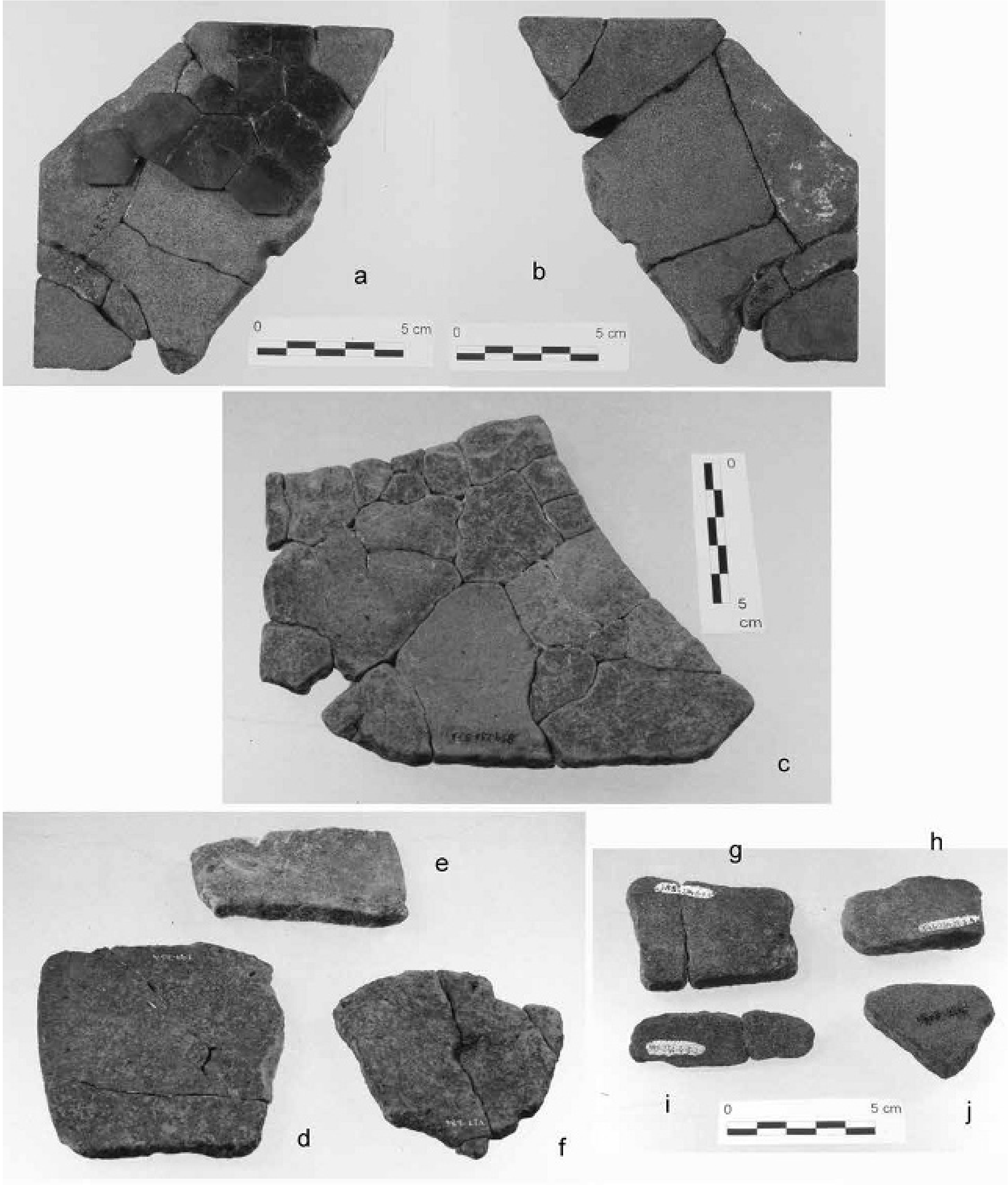


Figure 6.28. Mirror backs from Structure M8-4. (a–b) Sandstone. With pyrite pieces found with it. 23A4-3-3, Cat. 969-1. (c) Ceramic. 23A53-3-1, Cat. 859-1. (d–f) Ceramic. (d) 23A8-3-2, Cat. 390-1. (e) 23A49-2-1, Cat. 1054-1. (f) 23A8-3-2, Cat. 389-1. (g–j) Sandstone. (g) 23A8-3-4, Cat. 859-1. (h) 23A29-3-4, Cat. 596-1. (i) 23A6-3-2, Cat. 415-1. (j) 23A44-1-1, Cat. 245-1.

Table 6.5. Alabaster Vessels.

Lot	Catalog No.	Form	Weight (g)	Rim Thickness (cm)	Body Thickness (cm)	Rim Diameter (cm)	Height (cm)	Frequency	Rim	Base	Comments
22A12-3-1	2038-1	bowl or vase	4.4		0.41			1			glyphs, possibly part of Cat. 22A1054-1
22A22-2-3	924-1	bowl or vase	5.3		0.45	17.0		1			material unclear
22A45-3-1	2048-1	bowl	16.5	0.64		16.0		5	1		
22A49-3-1	1054-1	bowl	324.1	0.88	0.72	17.0		51	1	1	probably with glyphs, mending holes
22A9-1-1	146-1	bowl	20.3		0.74			1		1	
22A9-2-5	579-1	probably bowl	1.2	0.60		15.0		1	1		small rim fragment
22A9-3-4	2037-1	bowl or vase	9.9		0.44	14.0		2			glyphs, possibly part of Cat. 22A1054-1
22B2-3-1	197-1	bowl or vase	17.9	0.30		14.0		10	1		
23A31-3-2	2192-1	probably bowl	1.3					1			
23A38-3-3	1959-1	bowl	5.4	0.27	0.30	14.0		1	1		
23A6-3-4	450-1	bowl	218.7	0.50	0.90	13.0	6.5	35	1	1	mending holes
14B20-1-2	617-1	bowl	10.3		0.50			1			glyphs
23B2-3-2	446-4	probably bowl	2.4		1.44			2			

royal family. It is possible that the pyrite ornaments produced in Structure M8-4 were meant to be used by the ruler. If so, many of the numerous pyrite artifacts found in this building may also have been possessed or controlled by the ruler. The residents of other buildings appear to have kept small fragments of mirrors or single, detached pyrite pieces. These smaller pieces probably retained certain symbolic or social value.

ALABASTER VESSELS

Alabaster is a common name used for calcite, a mineral consisting of calcium carbonate ($CaCO_3$). It is a soft, half-translucent material that is easy to work with. The alabaster objects found at Aguateca exhibit a semi-translucent appearance with parallel layers, indicating that they were probably made of travertine (Evans 2010:191–209; Pillsbury et al. 2013:122–133). Alabaster objects found in the Maya Lowlands have sometimes been interpreted as imports from the Ulua Valley, but their material qualities are different from marble (metamorphic rock) used in that Honduran region. Although we have not identified specific travertine quarries at Aguateca, travertine, which can form in karstic caves, may have been obtained locally or in nearby areas in the Maya Lowlands. We found 112 alabaster pieces, which probably belonged to 12 or 13 vessels (Table 6.5, Figures 6.29–6.32): 62 were from Structure M7-22, 10 from Structure M7-32, 37 from Structure M8-4, 1 from Structure M8-13, and 2 from Structure M8-3. Most vessels appear to have been open bowls. Three vessels from Structure M7-22 and one from Structure M8-13 were carved with glyphs (see Chapter 13). A vessel from Structure M7-22 (Cat. 22A2048-1) was carved with a band of chevron motifs below the rim (Figures 6.29b, 6.31b). Two vessels (Cat. 22A1054-1 and 23A450-1) have mending holes (Figures 6.30a, 6.31a, 6.32a). Many fragments retained the original texture of alabaster in translucent white color, but some have turned brown and exhibit a laminated appearance (Figure 6.32). This change may have resulted from the decomposition of calcite into calcium oxide (CaO) through exposure to heat around 800°C or higher, the process called decarbonation (Ashurst and Ashurst 1988; Boynton 1980).

None of the recovered vessels was complete or reconstructible. Still, the number of fragments was striking.

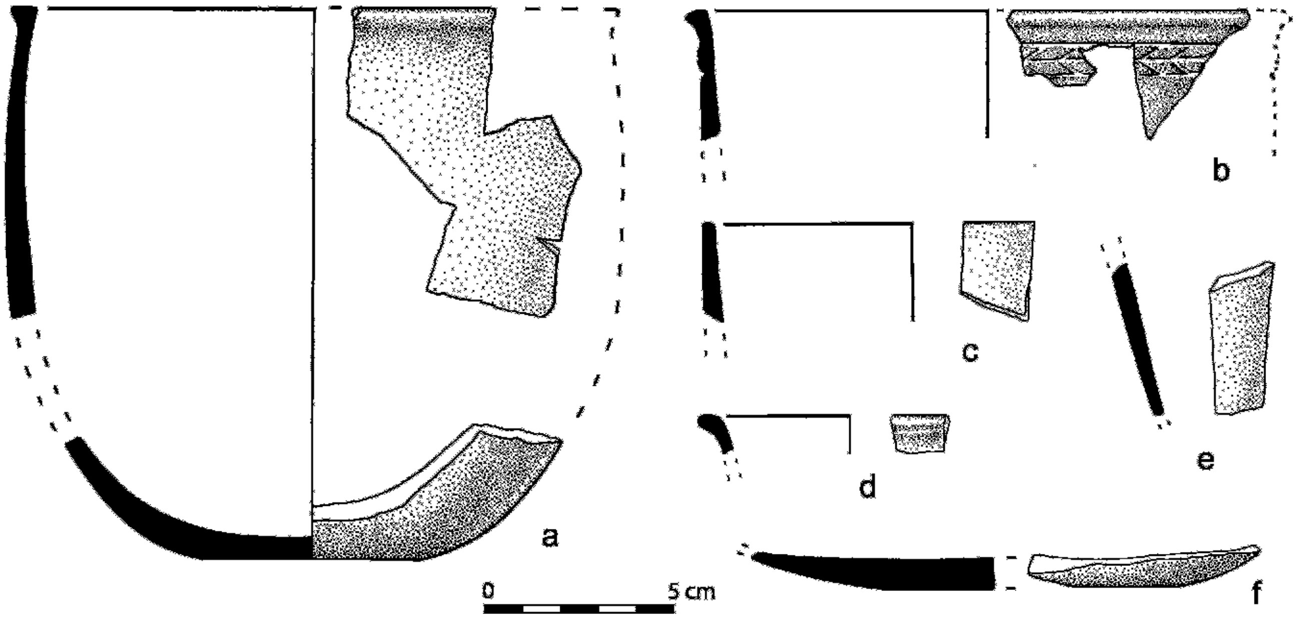


Figure 6.29. Alabaster vessel fragments from Structures M7-22 and M7-32. (a) 22A49-3-1, Cat. 1054-1. (b) 22A45-3-1, Cat. 2048-1. (c) 22B2-3-1, Cat. 197-1. (d) 22A9-2-5, Cat. 579-1. (e) 22A22-2-3, Cat. 924-1. (f) 22A9-1-1, Cat. 146-1.

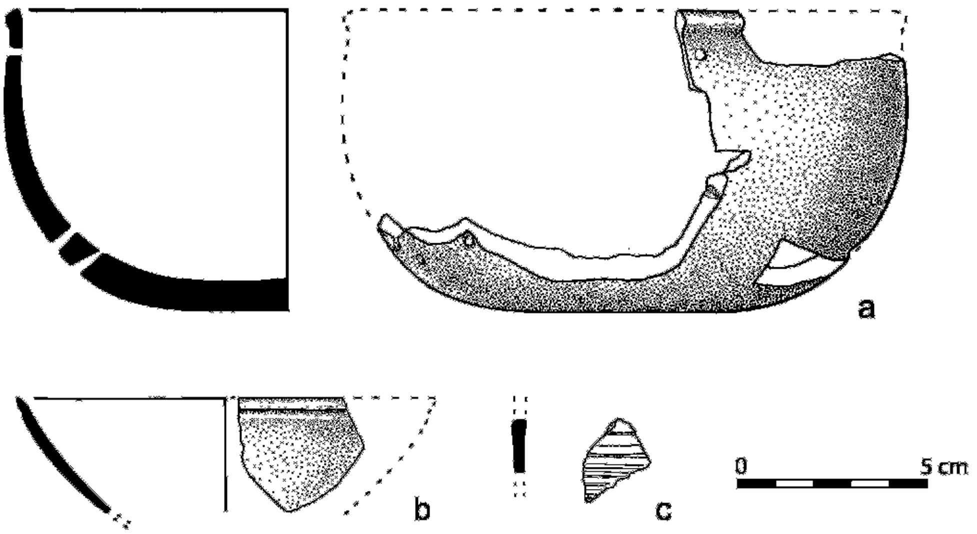


Figure 6.30. Alabaster vessel fragments from Structures M8-4 and M8-13. (a) 23A6-3-4, Cat. 450-1. (b) 23A38-3-3, Cat. 1959-1. (c) 23A31-3-2, Cat. 2192-1.

During the Petexbatun Project, three alabaster pieces, possibly belonging to one vessel, were found in Structure M8-10 (Inomata 1995:599). At other Lowland Maya sites, alabaster vessels are extremely rare. Only one fragment is reported from Ceibal (Seibal) (Willey 1978:90), none from Altar de Sacrificios (Willey 1972), and one fragment from the Harvard Copan Project (Willey et al. 1994:250) (For examples from other sites, see Chapter 13.) Given the general scarcity of this material in the Maya Lowlands, the large concentration of them in the dense deposits of Structures M7-22 and M7-32 at Aguateca distinguishes these deposits from common middens. A substantial portion of a vessel (Cat. 23A450-1) was found in the south room of Structure M8-4 near the Jester God diadem. An important question is whether the residents recycled the broken alabaster bowl for the production of the headband. As we

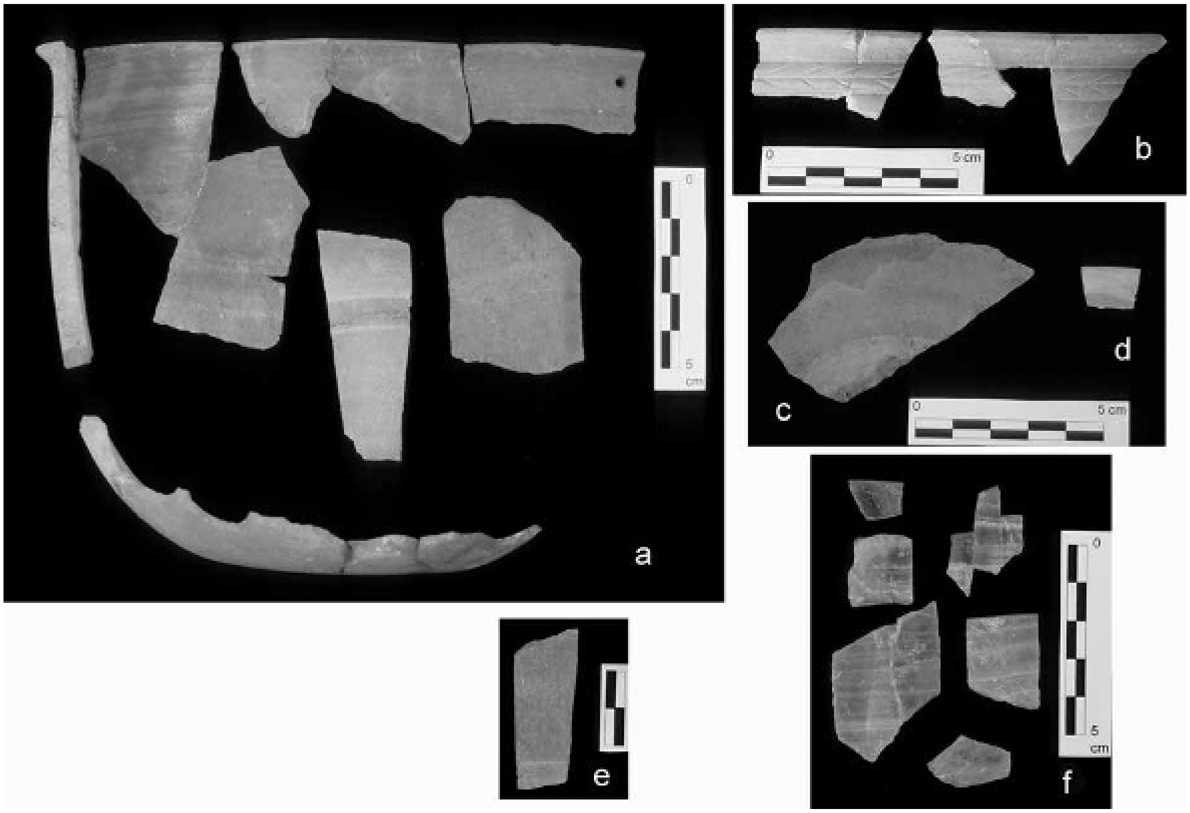


FIGURE 6.31. Alabaster vessel fragments from Structures M7-22 and M7-32. (a) 22A49-3-1, Cat. 1054-1. (b) 22A45-3-1, Cat. 2048-1. (c) 22A9-1-1, Cat. 146-1. (d) 22A9-2-5, Cat. 599-1. (e) 22A22-2-3, Cat. 924-1. (f) 22B2-3-1, Cat. 197-1.

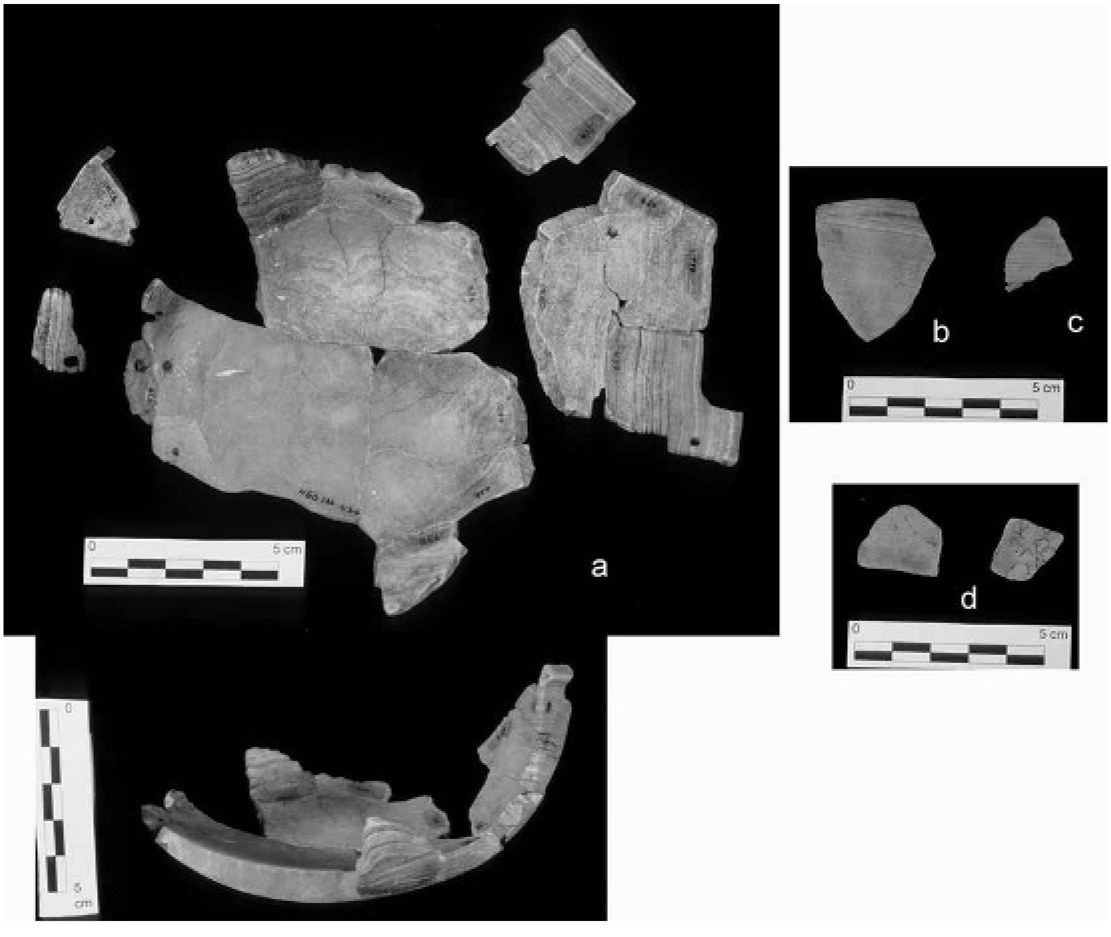


FIGURE 6.32. Alabaster vessel fragments from Structures M8-4 and M8-3. (a) 23A6-3-4, Cat. 450-1. (b) 23A38-3-3, Cat. 1959-1. (c) 23A31-3-2, Cat. 2192-1. (d) 23B2-3-2, Cat. 446-1.

Table 6.6. Pumice Stones.

Lot	Catalog No.	Condition	Work	Dimension (cm)	Weight (g)	Number of Fragments	Notes
22A6-3-1	743-1	broken	unclear	2.8	4	2	
22A44-3-1	1018-1	broken	worked	8.2	127	1	
22B39-3-1	504-1	broken	worked	4.8	15	2	
23A7-3-1	393-1	complete	worked	11.8	190	1	
23A17-3-1	1182-1	complete	worked	16.8	238	2	In the shape of a mano
23A17-3-1	1153-1	almost complete	worked	5.4	16	3	
23A21-2-1	1300-1	complete	worked	6.2	15	1	
23A21-3-2	2171-1	broken	unclear	3.0	4	1	
20A3-3-4	337-1	complete	worked	9.8	70	7	Flat facet
20A40-1-1	1103-1	broken	unclear	3.6	10	2	
20A43-3-4	1494-1	broken	unclear	4.8	22	5	
23B7-3-1	428-1	broken	worked	6.2	30	2	
23B17-3-4	610-1	complete	worked	8.3	111	1	
21A30-2-3	774-1	complete	worked	11.6	91	4	A line in the middle; in the process of being cut?
21A30-3-4	782-1	complete	worked	8.3	60	1	
21A39-3-4	550-1	complete	worked	9.5	52	1	
21A82-3-4	1029-1	complete	unclear	6.9	49	1	

refitted fragments, it became clear that the missing parts of the bowl were not large enough to provide material for all the headband pieces. It is still possible that a few plaques were made from the bowl. If so, the residents may have been repairing or modifying the headband. Yet the absence of alabaster debitage with cut marks leads us to favor the hypothesis that the alabaster bowl was not meant for recycling and that no new plaques were being added to the Jester God headband.

It is probable that the royal family enjoyed unparalleled access to these rare objects. Most other elites had to be content with partial vessels or fragmentary ones. Even small fragments, such as those found in Structures M8-3 and M8-13, appear to have retained symbolic value that made them worth keeping.

OTHER STONE ARTIFACTS

This section discusses pumice stones, possible pigments, a phallic object, petrified wood, and miscellaneous stone artifacts.

Pumice Stones

We recovered 17 pumice stone artifacts, some of which were broken into smaller fragments (Table 6.6, Figure 6.33). Pumice stones were probably imported from the highlands, but we should also consider the possibility that they were carried to the lowlands by rivers. Although the stones are now soft and can be scratched by nails, they may have been harder originally. The material floats in water. When scratched or abraded, it produces fine powder and a small amount of glass crystals that measure 0.1 to 0.3 mm in length. Most pieces have irregular shapes with one or two flat facets, which were probably used for abrasion. These pieces may have been used as rubbing stones. Powder of pumice stone may also have served as fine temper for ceramic paste or as a parting material that covered molds for ceramic vessels or figurines. Since pumice stones are easily scraped, they are not adequate for food processing. The material was found in most of the extensively excavated structures, except Structure M8-13. One example (20A337-1) was artificially shaped with a flat facet and was probably used as a rubbing stone (Figure 6.33d). Another example was worked into a shape similar to a mano (23A1182-1, Figure 6.33c). Cat. 21A774-1 has a shallow groove (Figure 6.33h); it was probably in the process of being cut in half.

Pigments

The category of pigments includes prepared pigments and possible raw materials (Table 6.7, Figure 6.34). Three specimens of prepared pigments were found. The materials from 22A 6-2-4 and 22B 2-3-1 were in small pieces (Figure 6.34r–s). The former is the color 2.5YR3/6 (dark red), and the latter is 7.5R3/4 (dusky red). The specimen from 23B15-3-4 is a fragment of a ball of specular hematite pigment in the color 7.5R4/6 (Figure 6.34j). The residents of

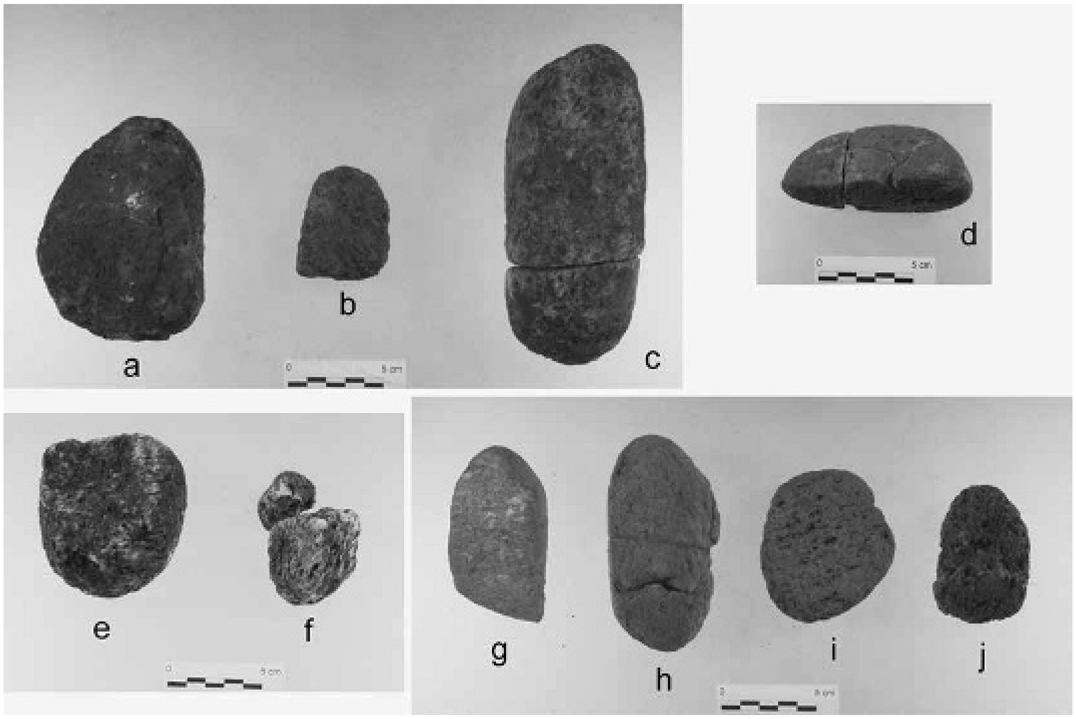


Figure 6.33. Pumice stones. (¼ scale) (a–c) From Structure M8-4. (a) 23A7-3-1, Cat. 393-1. (b) 23A21-2-1, Cat. 1300-1. (c) 23A17-3-1, Cat. 1182-1. (d) From Structure M8-8. 20A3-3-4, Cat. 337-1. (e) From Structure M8-2. 23B17-3-4, Cat. 610-1. (f) From Structure M8-3. 23B7-3-1, Cat. 428-1. (g–i) From Structure M7-34. (g) 21A39-3-4, Cat. 550-1. (h) 21A30-2-3, Cat. 774-1. (i) 21A30-3-4, Cat. 782-1. (j) From Structure M7-91. 21A82-3-4, Cat. 1029-1.

Table 6.7. Types of Pigments.

			Palace Group		Causeway Area					Barranca Escondida	Granada Group
Material	**Preparation**	**Total**	**22A**	**22B**	**23A**	**20A**	**14**	**23B**	**21A**	**24**	**26**
Hematite	Raw material	133	4	8	66	13	7	7	5	15	8
Specular hematite	Raw material	1				1					
	Prepared pigment	1						1			
Limonite	Raw material	46	10		11	6	8	2	5	4	
Ochre	Raw material	2	1							1	
Undetermined	Prepared pigment	2	1	1							
Total		185	16	9	77	20	15	10	10	20	8

Note: Mineralogical identifications are tentative.

Structure M8-3 probably kept the ball of pigment in an organic container. The soil surrounding the pigment was colored in red.

All forms of iron ore, except pyrite, were collected as possible raw materials for pigment. They probably include hematite and limonite, but their mineralogical identities are tentative. These materials most likely become red when fired in oxidizing atmospheres. Many samples are small round nodules with shiny, black-to-dark-brown surfaces (5YR2.5/1–5YR3/2). Some materials have more reddish colors (7.5R2.5/1–7.5R5/8, 10R2.5/2–10R4/8), yellow-to-brown colors (7.5YR4/6–7.5YR5/8), or olive-to-green colors (5Y5/4) in the interiors or on the exteriors. Such materials were found in all the operations, which suggests that pigment preparation and use were common activities carried out by numerous households (Inomata 1995:601).

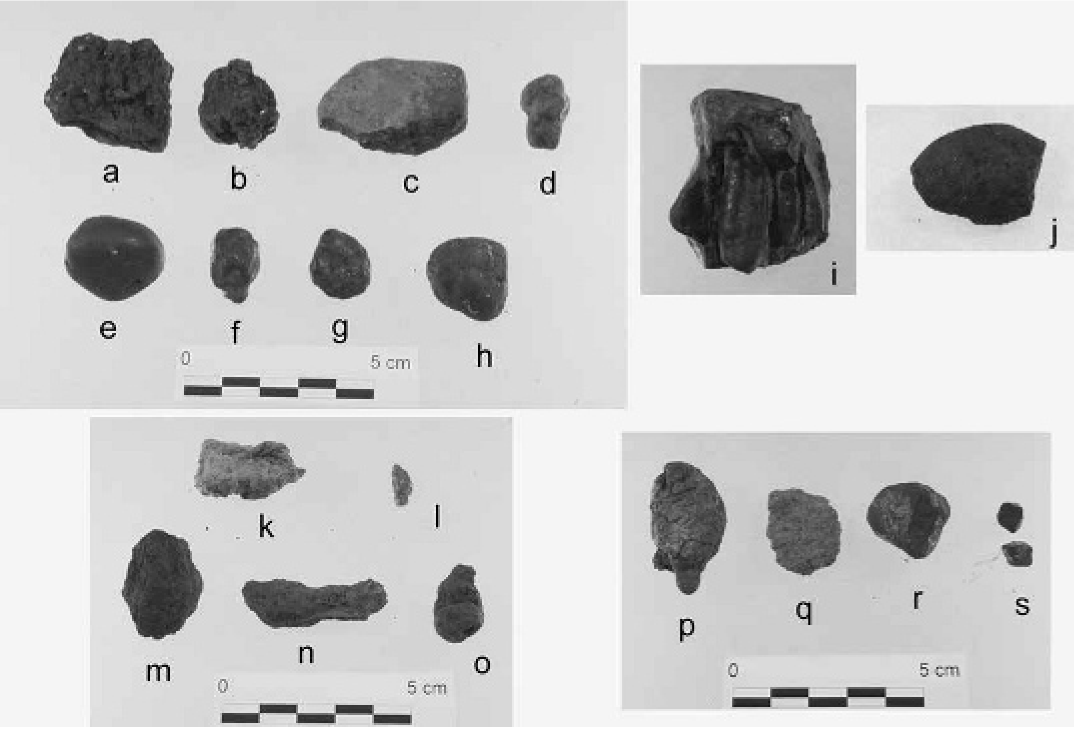


Figure 6.34. Possible pigments. (a–i, k–q) Probable raw materials for pigments. (a) 23A49-2-1, Cat. 1063-1. (b) 23A48-3-4, Cat. 1693-1. (c) 23A31-3-4, Cat. 2245-1. (d) 23A6-3-4, Cat. 438-1. (e) 23A16-1-1, Cat. 136-1. (f) 23A27-3-2, Cat. 531-1. (g) 23A29-3-3, Cat. 600-1. (h) 23A29-3-4, Cat. 653-1. (i) 20A31-3-1, Cat. 1526-1. (j) Prepared specular hematite pigment. 23B15-3-4, Cat. 208-1. (k) 20A19-2-3, Cat. 1052-1. (l) 20A18-3-2, Cat. 999-1. (m) 23B2-1-1, Cat. 122-1. (n) 23B18-3-4, Cat. 523-1. (o) 23B12-3-2, Cat. 574-1. (p) 24B13-1-1, Cat. 152-1. (q) 21A49-3-2, Cat. 1503-1. (r) Prepared red pigment. 22A6-2-4, Cat. 2017-1. (s) Prepared specular hematite pigment. 22B2-3-1, Cat. 201-1.

We should be cautious in analyzing the distribution of these materials, however. It is not clear whether these iron ores were intentionally collected and stored for later use as pigments or whether they were included unintentionally in construction fills. Despite this problem, the high number of iron ores in Operation 23A (Structure M8-4), where several stone mortars and pestles were found, appears to be related to the use of pigments. A large amount of pigment raw materials was found in the Barranca Escondida, which may indicate their symbolic value.

These pieces of iron ore were probably not for ceramic temper. Ferruginous particles, contained in some ceramic artifacts including Tinaja/Pantano jars, polychrome vessels, and figurines, have round shapes measuring 0.5 to 2.5 mm in diameter. These materials appear to have been collected as small pieces, instead of being ground from larger iron ores.

Phallic Object

A phallic-shaped object was found behind Structure M8-8 (20A22-3-1, Cat. 1357-1, Figure 6.35). It was carved from a stalactite or stalagmite taken from a cave or chasm. The object probably held symbolic value, although its specific meaning and use remain unclear. Depictions of sexual acts and penises are not uncommon in paintings found in caves, including Actun Ch'on (Stone 1995:Figure 4.38) and Naj Tunich (Stone 1995:Figures 6.16, 6.28) (see also the Oxtotitlan cave painting for other Mesoamerican groups). It is possible that caverns or speleothems had sexual implications (see Brady 1989:255–257). Mayer (2012) compiled a list of phallic-shaped portable objects, including those found at Isla Cerritos, Altar de Sacrificios (Willey 1972: 138), Nixtunchich, Zacpeten (Pugh and Rice 2009:162, 165, 168), northern Belize (Mayer 2002), Oxkintok (Pablo Aguilera 1991:98), and Santa Elena, Yucatan.

Petrified Wood

Seventy-four fragments of petrified wood were found in the Barranca Escondida and were analyzed by Eberl (Figure 6.36). The geologists Dr. Franz and Dr. Valdivia-Manchego, the paleobotanist Prof. Litt, and the petrologist Dr. Braun (all University of Bonn, Germany)

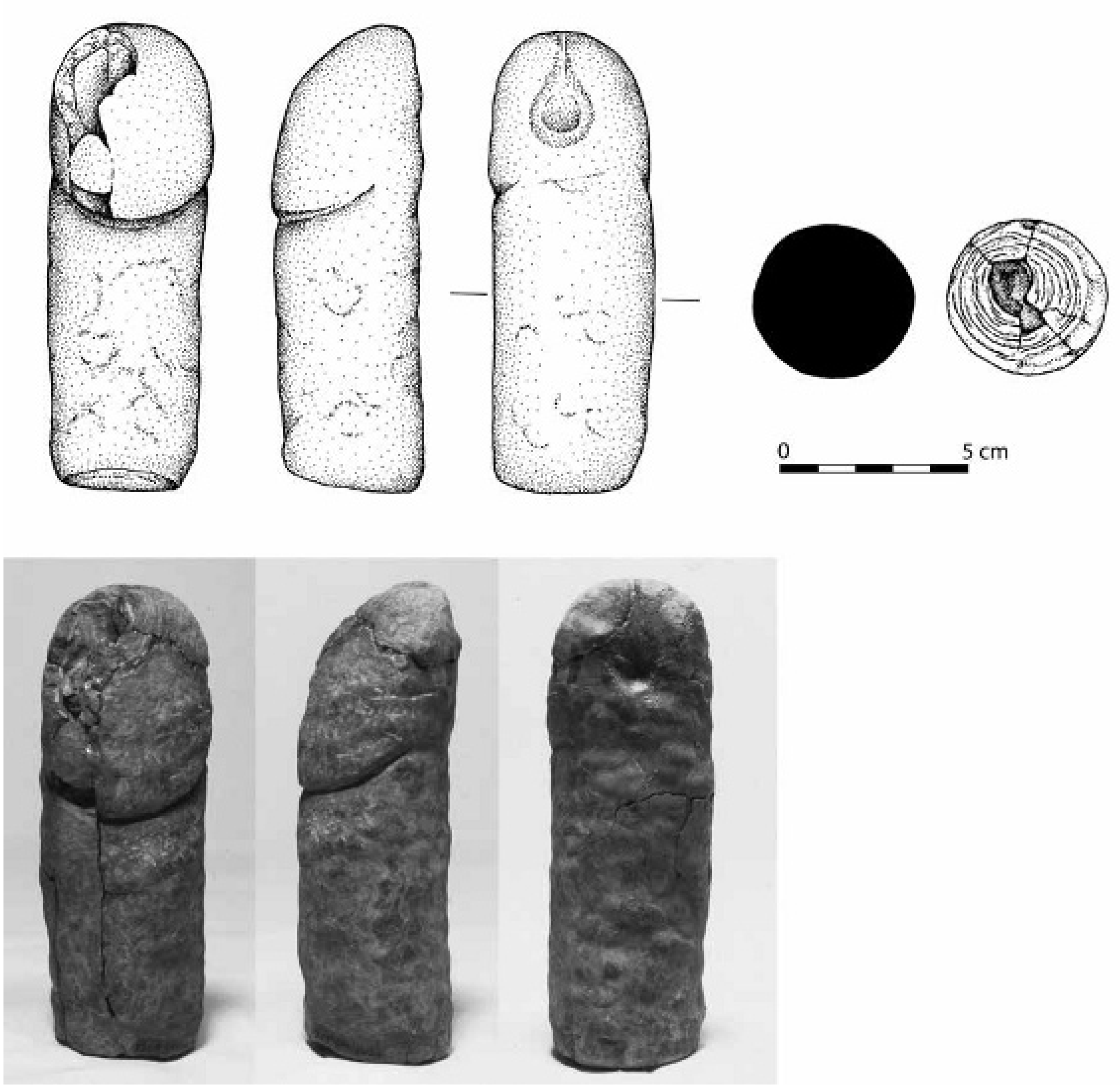


Figure 6.35. Phallic object from Structure M8-8. 20A22-3-1, Cat. 1357-1.

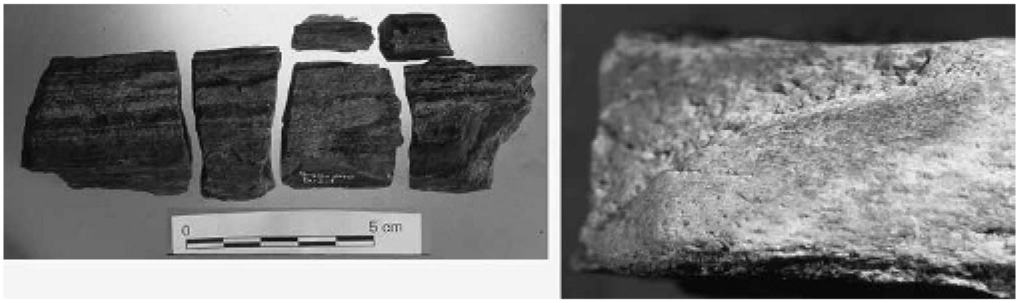


Figure 6.36. Petrified wood from the Barranca Escondida. Left: A refitted stick. (½ scale)
Right: Close-up view of an abraded tip (not to scale).

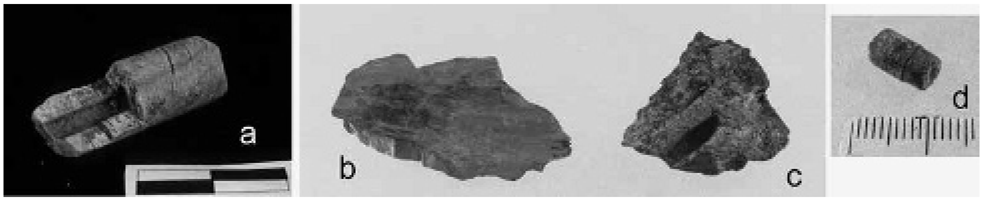


Figure 6.37. Other stone artifacts. (1/1 scale) (a–c) Possible fossil. (a) 14B3-2-3, Cat. 482-1. (b) 21A47-3-1, Cat. 1502-1. (c) 26B1-1-1, Cat. 108-1. (d) Possible modern metal artifact. 23A47-3-4, Cat. 2032-1.

identified them. They pointed out that the limestone formations of the Peten date to the Eocene and that petrified wood can occur in formations of similar age. Yet petrified wood has no known source in the Maya area or in Mesoamerica, and this material is rare at Maya sites. An Early Classic to early Late Classic crypt burial at Tikal contained two petrified wood fragments (Moholy-Nagy 2003a:56, Figure B:120f), and a rectangular piece of petrified wood was found in Group CV-20 in the Copan valley (Willey et al. 1994:261, cat. no. 1-156). Willey et al. (1965:490) report four pieces of petrified wood from Early and Late Classic contexts of Barton Ramie.

The 74 fragments weigh just less than 1 kg. They were found exclusively on the rock outcrop and its northern front. Eighteen of the 74 fragments fit together, making six larger sticks that can comfortably be held in a hand. These fragments are often not from the same or even adjacent units. Their dispersion over a large area and their hardness suggest that they were intentionally smashed and scattered.

Several petrified wood fragments have use-wear in the form of abrasion and blackening (Figure 6.36). The abrasions are restricted to a small smoothed and rounded area at the tip of the fragment and otherwise show no signs of erosion. Blackening and discoloration occur in spots, hinting at selective exposure to fire.

Miscellaneous Stone Artifacts

Three objects appear to be fossils, but their identities are not certain (Figure 6.37a–c). Reports of fossils from Maya sites are rare, but one was found in a Late Classic context at Barton Ramie (Willey et al. 1965). A small object from Structure M8-4 was heavy and may be a modern metal artifact, but we are not certain of its identity (Figure 6.37d).

chapter 7

Ceramic Laminates

Harriet F. Beaubien

Among the items recovered by the Aguateca Archaeological Project from a royal residential building, the House of Masks (Structure M7-22), were the remains of shattered and fire-damaged objects composed of an unusual material with biscuit-like fragility (Inomata et al. 2001:294–296; Inomata and Ponciano 2010:24–39, Figure 2.18) (Figure 7.1). While aspects of the fragments were reminiscent of thin ceramic sherds, careful examination and subsequent technical analysis showed that they had originally been formed from multiple layers of woven cloth coated with clay slip (Beaubien 2004b). Conservation from the time of excavation in 1998, and during all subsequent processing, allowed the fragments from these deposits to be stabilized, partially reassembled, and studied more thoroughly from a technological standpoint (see Chapter 11 in this volume). The better-preserved of the two skillfully crafted objects proved to be a mask in the form of an old man's face, complete with eye holes and attachment perforations on the sides (22A14-3-3, Cat. 862-1) (Figure 7.2). The other included bulging eyes and fang components but lacked obvious eye holes, suggesting a headdress component rather than a face mask (22A10-3-3, Cat. 861-1) (Figure 7.3 and 7.4).

From a strictly materials standpoint, these objects are significant because they provide the strongest evidence of a previously unsuspected "ceramic laminate" craft technology. Until their discovery, the existence of such a material type and technology had only been hinted at on the basis of a technical investigation, carried out four years earlier at the Smithsonian Institution, of several fragments found in Cueva de los Quetzales, a cave underlying the ceremonial center of Las Pacayas, also in the Petexbatun region of the Peten (Brady et al. 1997; Beaubien et al. 2002). Although a small number of additional examples have been found at several other Peten sites, suggesting wider distribution of the technology, excavations at Aguateca have yielded the largest number of finds of this material type, in a variety of contexts, as well as the only clearly identifiable objects to date.

TECHNICAL OVERVIEW

The technological features of the Aguateca material were studied during on-site and laboratory conservation of the finds in Guatemala and through instrumental analysis of a limited number of samples at the Smithsonian Institution's Museum Conservation Institute (then known as the Smithsonian Center for Materials Research and Education). Replication studies and examination of other examples identified during subsequent collections-based research in Guatemala were also critical for formulating hypotheses about the technological processes of crafting objects with this material (Beaubien et al. 2002).

Components

The term "ceramic laminate" was selected for the material type on the basis of its similarity in aspects of composition and fabrication to modern industrial composites, or "laminates" (e.g., Lubin 1982). These are typically composed of a filler material in a matrix material, formed in layers that are stacked, united, and shaped by molding. The Aguateca examples consisted of multiple layers composed of woven textile (filler) and clay (matrix) in the form of a slurry or slip, which coated each textile layer and served as the "adhesive" between layers, thus creating a laminated unit. The textiles (now universally absent) were visible in cross section as a stacked pattern of holes where threads had once been (Figure 7.5a). Where the outermost clay surfaces were abraded, imprints of the weave pattern were visible in the clay layer (e.g. Figure 7.4). The imprints, studied directly or by using impressions taken with quick-setting dental impression compound, indicated that the textiles typically were varieties of plain weave, most commonly

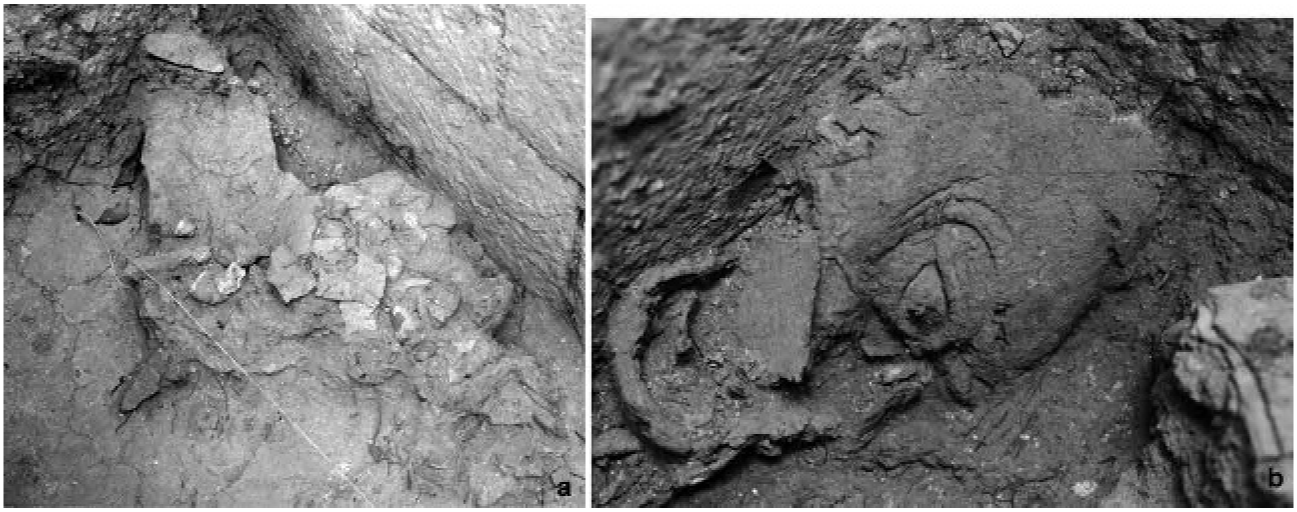


Figure 7.1. Ceramic laminate deposits from the easternmost room of Structure M7-22. (a) 22A10-3-3, Cat. 861-1. (b) 22A14-3-3, Cat. 862-1.

with single elements in each direction but occasionally with paired or tripled elements in one of the directions (Figure 7.5b).

Assembly, Shaping, and Finishing

The thickness of the Aguateca fragments, in the range of 2–5 mm, was created using at least three slip-saturated textile layers. While still wet, these limp materials would have needed a form (or mold) to support the layers as they were being built up and until they dried. Thanks to its more complete preservation, the face mask (Cat. 22A862-1) offers considerable evidence of its manufacture. Several features argue for use of a convex form over which the textile layers were draped. These include the mask's relatively smooth interior topography, which would have been in direct contact with the form, and the sculptural quality and weave distortion of folded shapes seen on its exterior, which could have been freely manipulated in the still-wet outermost layers. In laboratory replication experiments, these features were produced easily and uniquely on a simple convex form (Figure 7.6a); with a concave mold, by contrast, the sculptural details had to be crafted in the negative in order for replicas to retain those features on their exterior surface. Further insight was unexpectedly offered by the detachable mount, fabricated to support the face mask in storage and on display (see Chapter 11 in this volume). Molded closely against the mask interior, the mount's surface simulated that of the original form. Its uncanny resemblance to the face area of a human cranium argued strongly for the use of a skull as a form over which the laminate mask was made (Figure 7.6c).

Finishing steps for the mask included making the eye holes, perforations, and neat borders. Laboratory replication experiments showed that once the laminate had dried to a leather-hard state, the stiff object could be gently lifted off the form or removed from the mold, and minor modifications could be easily carried out with localized wetting (Figure 7.6b). In the case of the face mask, a red pigmented slip, analyzed as an iron-bearing compound such as hematite, was also applied to the exterior surface.

Hardening with Heat

While depositional events at Aguateca obscure evidence that heat hardening might have occurred as a final production step for laminate objects, all examples from Aguateca and other sites support this deliberate transformation to a ceramic-like product. Low-temperature firing, confirmed by laboratory replication experiments, would be sufficient to make the dried laminate objects rigid, resistant to water exposure, lightweight (particularly with the loss of the textile constituent), and practical for use.

CATALOG OF FINDS

In its investigation of the site core, the Aguateca Archaeological Project recovered significant deposits of ceramic laminate fragments in two different structures, as well as limited occurrences in several other contexts, listed by location in the sections below. Other phases of investigation at Aguateca also recorded fragments, subsequently identified as the same material type, including those carried out by the Petexbatun Regional Archaeological Project (1990–1994) (Inomata 1995, 2007a; Demarest 1997) and

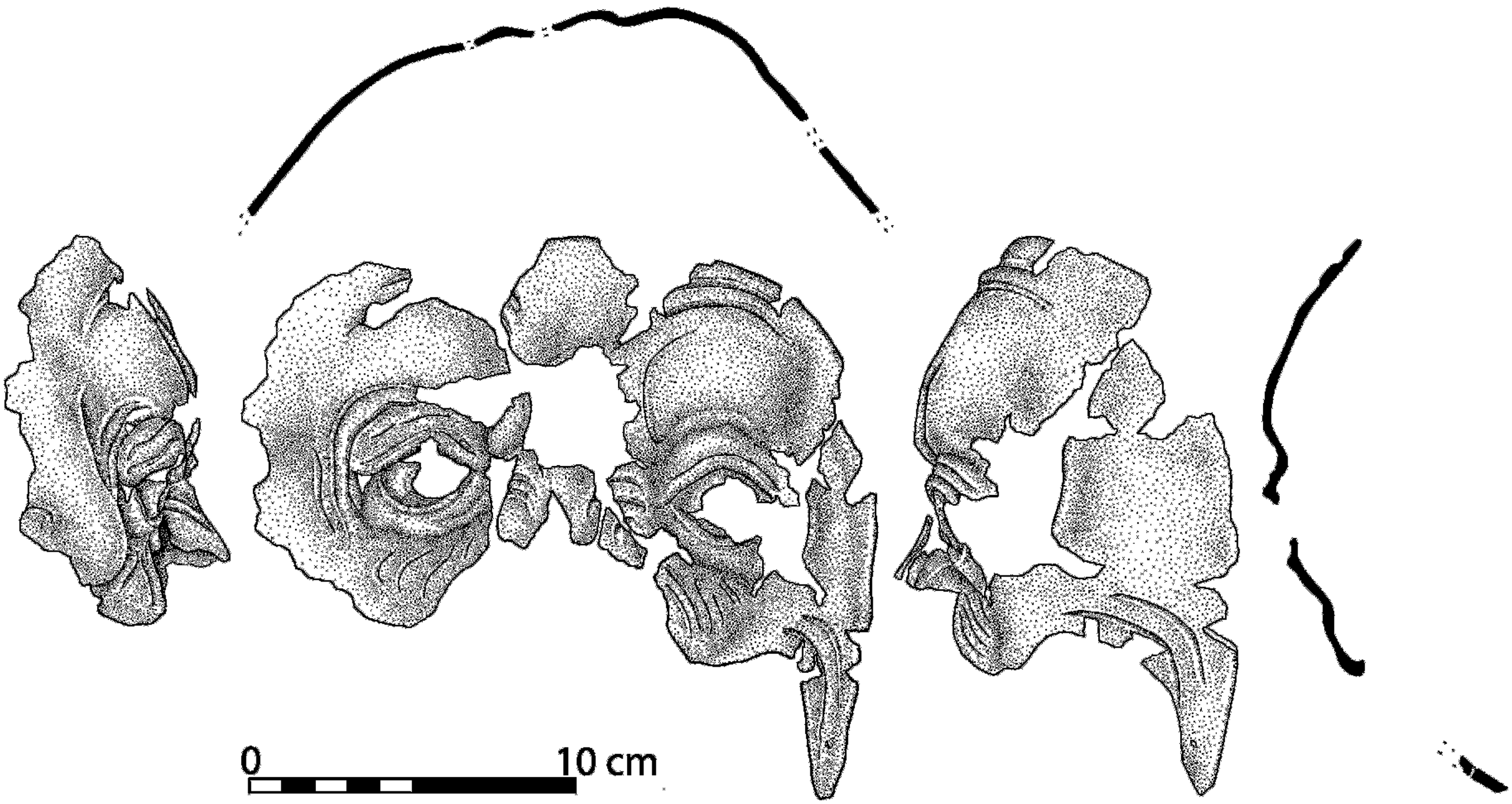


Figure 7.2a. Drawings of a reconstructed ceramic laminate mask. 22A14-3-3, Cat. 862-1. (½ scale)

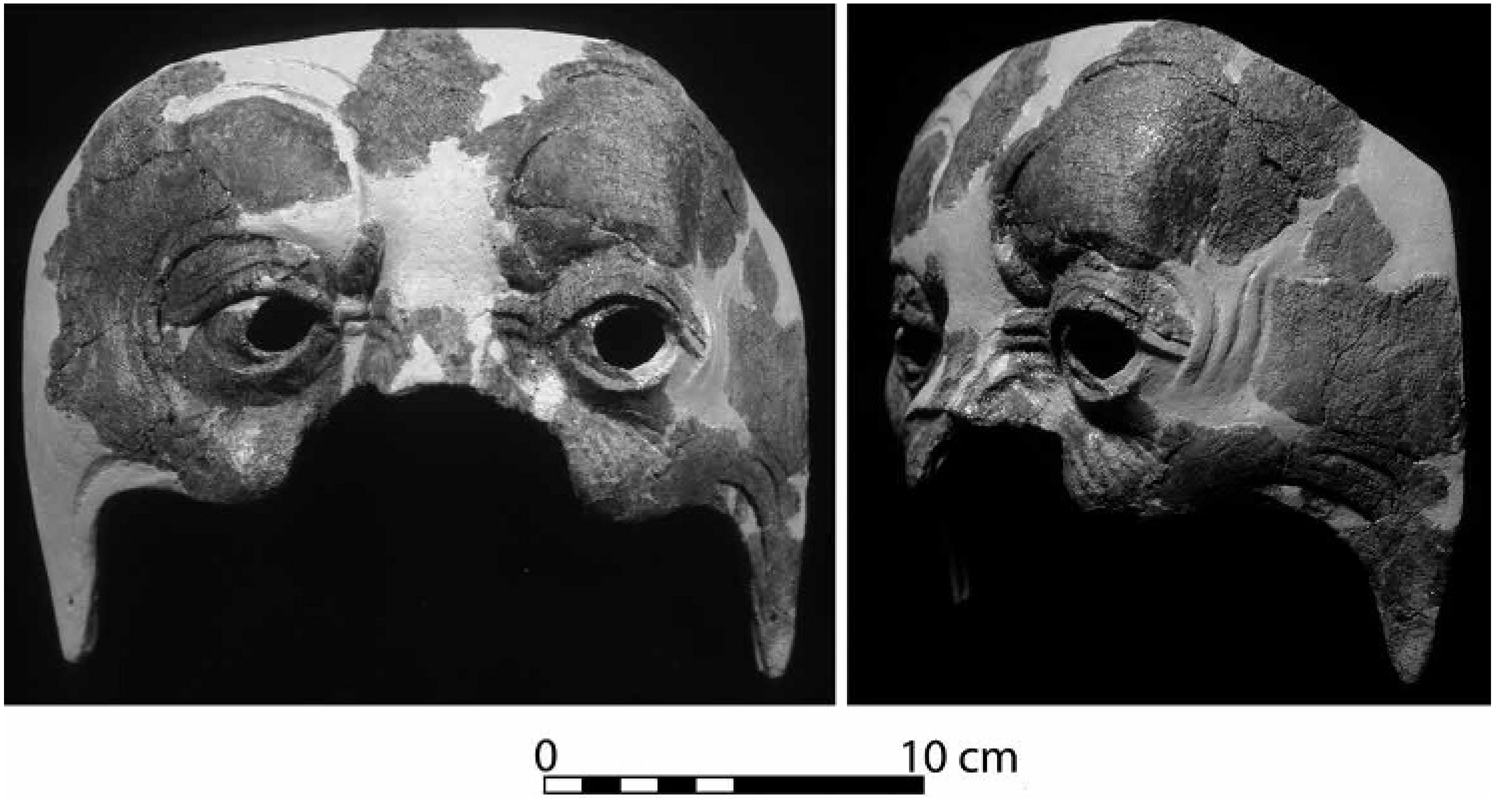


FIGURE 7.2b. Photographs of a reconstructed ceramic laminate mask. 22A14-3-3, Cat. 862-1. (½ scale)

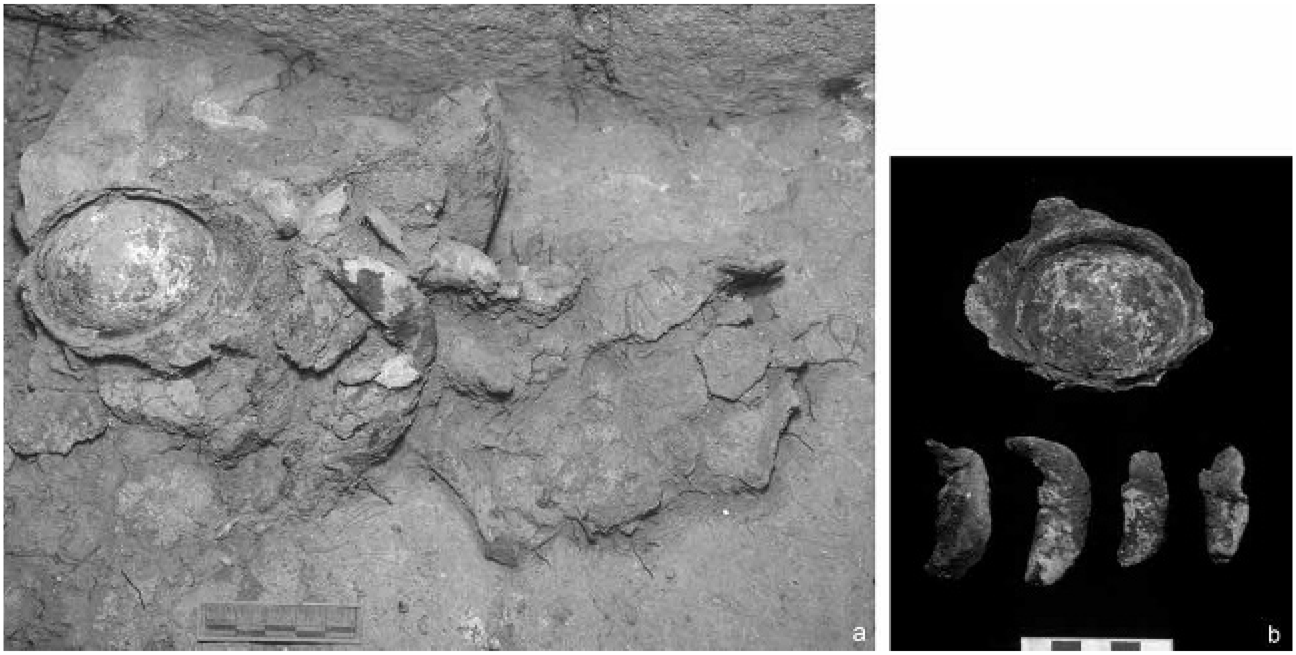


Figure 7.3. Ceramic laminate headdress. 22A10-3-3, Cat. 861-1. (a) Detail of deposit in situ. (b) Fragments after conservation. (Not to scale)

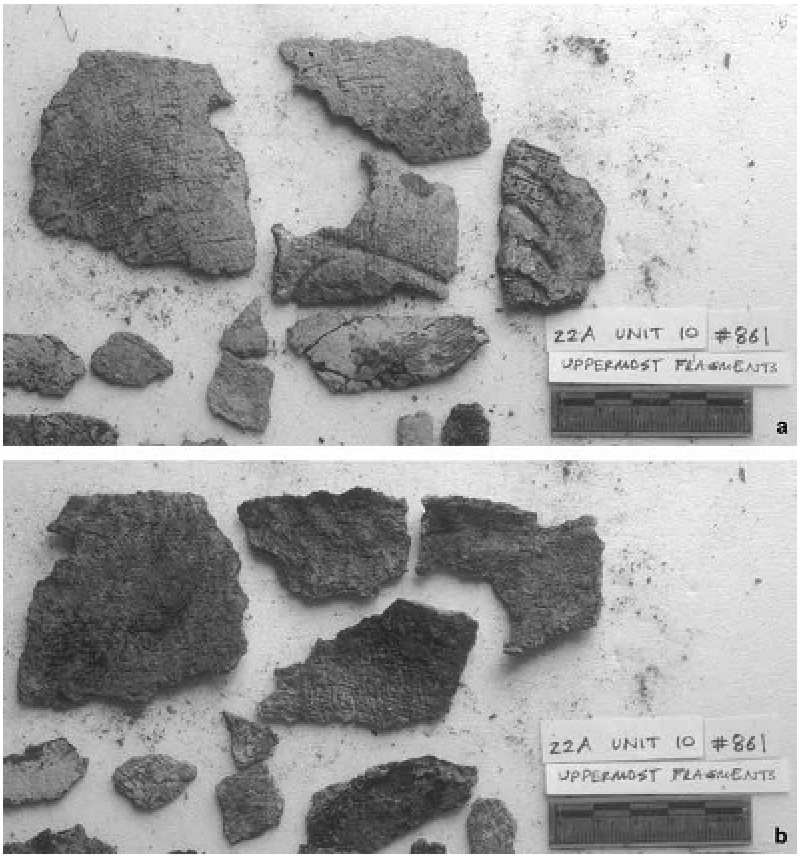


Figure 7.4. Selected fragments of the headdress. 22A10-3-3, Cat. 861-1. (a) Outer surface of fragments with visible textile imprints. (b) Inner surface of fragments with visible textile imprints. (½ scale)

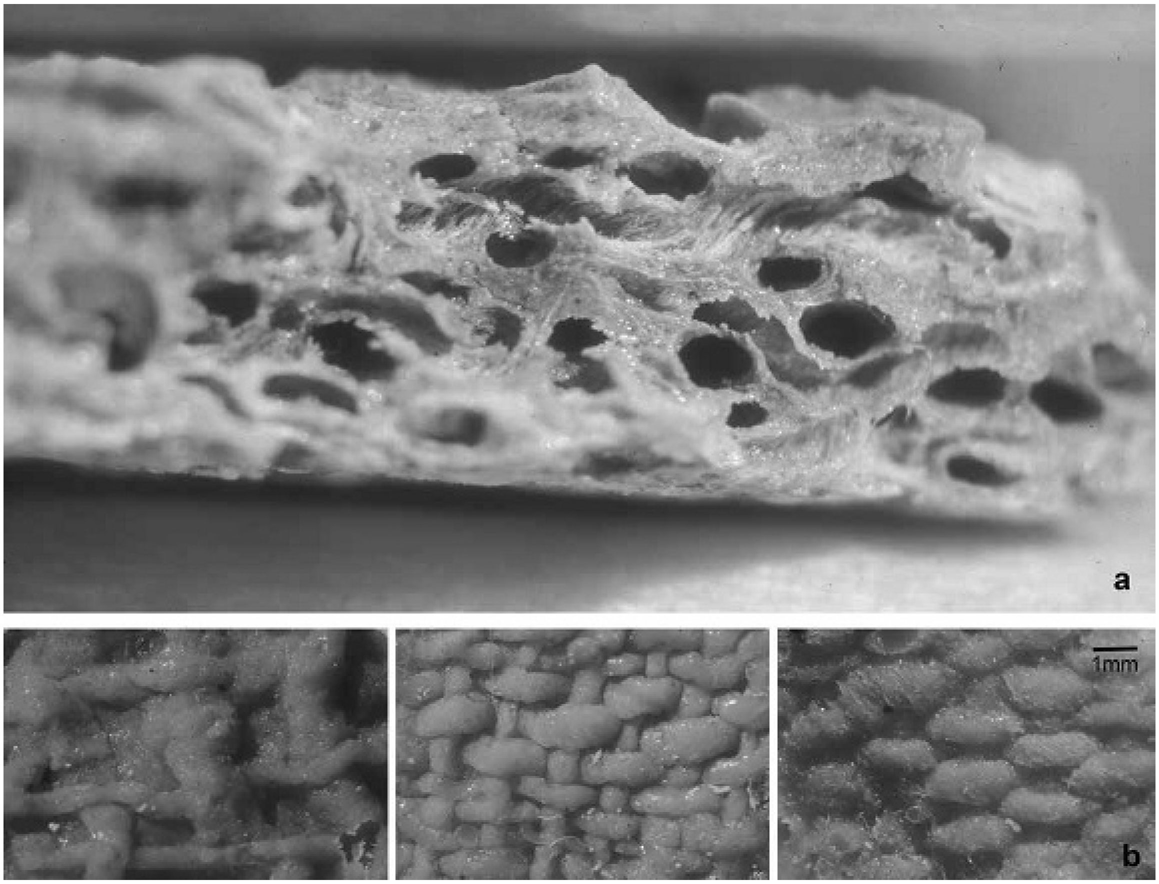


Figure 7.5. Microscopic views of mask fragments. 22A14-2-5, Cat. 862-1. (a) Cross section, showing stacked pattern of voids once occupied by textile threads. (b) Details of impressions taken from three fragments, showing textile weave variations (each approximately 1 cm wide).

during both archaeological excavations and restoration activities carried out under the aegis of the Aguateca Restoration Project First Phase (1999–2000) and Second Phase (2002–2004). These projects' finds from the site core are included under "other finds." Those from other areas of the site are summarized in a section for related finds, which also includes examples found at sites elsewhere in the Petexbatun and wider Peten regions.

Palace Group

Structure M7-22 (House of Masks)

During the Aguateca Archaeological Project's 1998 field season, numerous laminate fragments were excavated in the easternmost room of this royal residential building (Inomata et al. 1998:27–32; 2001:294–296). They were found on the floor and intermixed with wall collapse in front of the room's bench. Technical investigation and conservation suggest that the fragments belong to two discrete but related ceremonial objects.

The face mask (22A14-3-3, Cat. 862-1) was found in several large segments and a number of fragments in the northwest corner of the floor next to the bench, in Unit 14 (Figure 7.1b). Associated with it were five other fragment groups (counts shown in parentheses): 22A331 (>100), 22A648 (52), 22A749 (13), 22A814 (10), and 22A866 (14). The reassembled component constitutes the upper part of the face, life-sized with old-man features and holes in the eyes (Figure 7.2). Many fragments, representing flaring nostrils, lips, and toothless gums, may have formed a separate component that was fastened to the lower part.

The other item (22A10-3-3, Cat. 22A861-1) has exaggerated animal/grotesque facial elements with no apparent eye openings and is interpreted as a headdress component. It was found in many fragments in the southwest corner of the floor next to the bench, in Unit 10 (Figures 7.1a, 7.3, 7.4). Associated with it were eight other fragment groups: 22A625 (46), 22A642 (14), 22A794 (~50), 22A796 (6), 22A809 (7), 22A810 (5), 22A834 (22), and 22A836 (7).

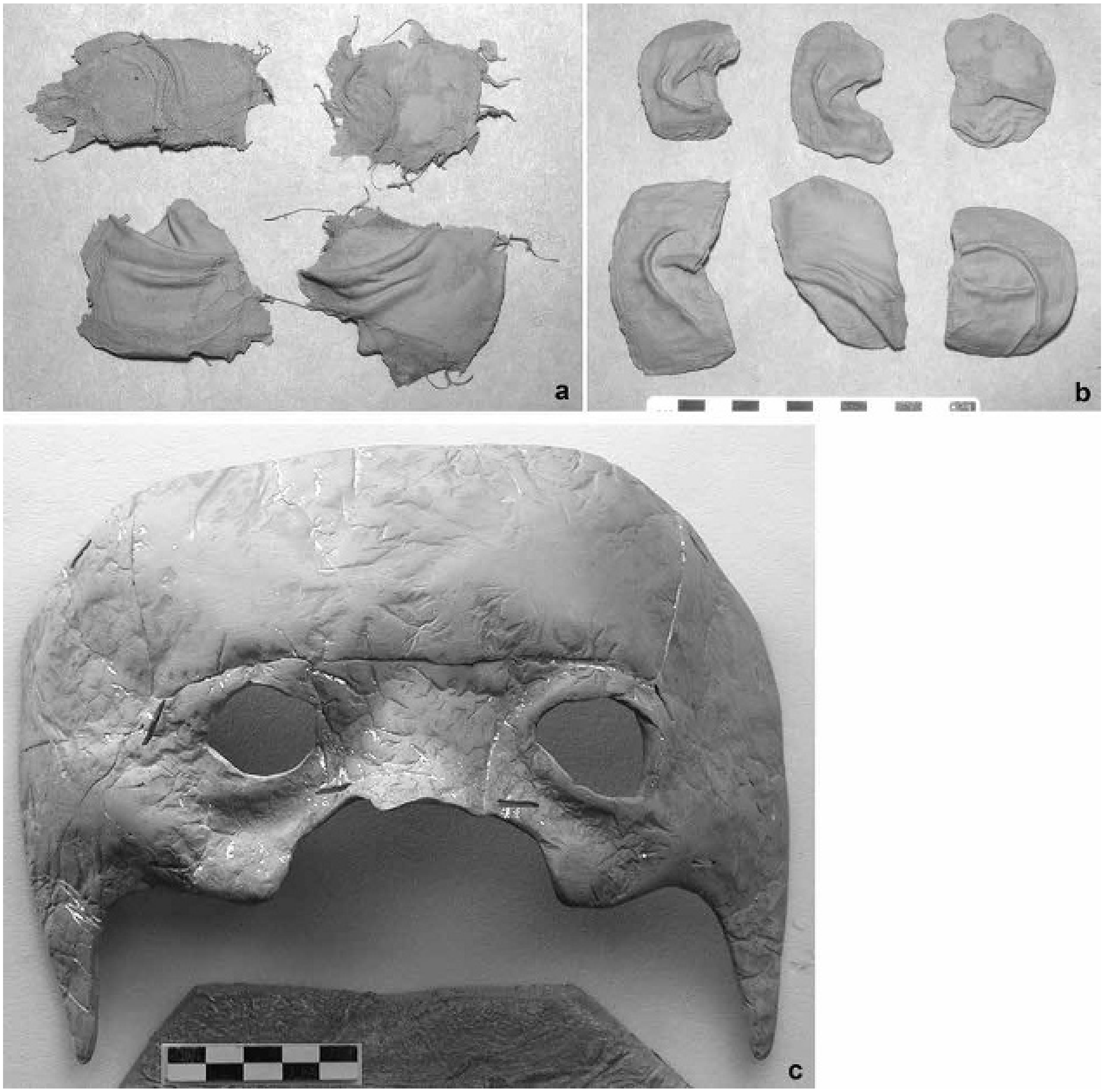


FIGURE 7.6. Ceramic laminate fabrication process. (Not to scale) (a) Replicate samples, formed on a smooth convex form, using multiple layers of loosely woven cotton textile saturated with clay slip, dried but unfinished. (b) Replicate samples, rewetted to finish the edges. (c) Detachable mount for Cat. 22A862-1, reflecting the shape of the original form on which the mask was modeled.

Other Finds

In 1999 the Aguateca Restoration Project First Phase excavated a large ceremonial building in the Palace Group, Structure M7-26, and found a large deposit of ceramic laminate fragments just south of the southern limit of the building (Inomata et al. 2001:294; Inomata 2001c:43–44; Urquizú 1999). The finding was identified as a mask based on fragments that included large eye and ear features; unfortunately, this deposit was lost during a subsequent intrusion at the site storage facility.

Causeway Area

Structure M8-4 (House of Mirrors)

Excavations in 1999 by the Aguateca Archaeological Project found numerous laminate fragments, distributed primarily in front of the central and northern rooms, in porch-like areas each equipped with a bench (Inomata et al. 2002:310–318). Technical investigation and conservation suggest that most of these may have been part of a single object found on the floor near the bench outside the central room (23A48-3-3, Cat. 2036-1 and Cat. 1690 [4]). Partial reassembly resulted in a segment with a smoothly curving expanse and finished edge; a number of otherwise flat fragments from the deposit have features such as small perforations. Fragment groups also found in wall collapse and on the floor outside the central room include 23A1281 (1), 23A1394 (4), 23A2169 (2), and 23A2170 (8). Another fragment group was found on the floor within the central room, 23A1967 (7). Fragment groups found on the floor and in wall collapse outside the north room include 23A1385 (3), 23A1515 (2), 23A2119 (3), and 23A2121 (4); one group, 23A2137, was found on the bench in the north room. Several fragment groups, 23A1315 (3) and 23A2125 (1), were found in wall collapse outside the north side wall of the building; one, 23A1838, was found outside the rear wall of the south room.

Other Finds

The Petexbatun Regional Archaeological Project excavated Structure M8-10 (House of the Scribe) in 1993, recording a small number of fragments later identified as the ceramic laminate material type. One was found in the north room, three were found outside the central room, and one was associated with a small wall built later outside the central room (Inomata et al. 2001:294). More examples were found in excavations of Structure M8-11, carried out by the Aguateca Restoration Project First Phase in 1999, following up initial investigations carried out in 1995 by the Petexbatun Regional Archaeological Project. Eight fragments forming a thick-walled segment approximately 15 cm in length, with a rim-like edge, perforation, and red slip coloring, were found in association with the building's platform, and five fragments came from a trench outside the structure (Díaz Samayoa and Valdés 1999). A third building, Structure M8-37, produced approximately 15 fragments from excavations of a wall in the northern room, carried out by the Aguateca Restoration Project First Phase in 2000 (Díaz-Samayoa and Valdés 2000).

Granada Group: Group L8-9

A group of small mounds to the west of the Main Plaza was investigated by the Aguateca Archaeological Project in 1999; excavations in the patio to the south of Structure L8-70 produced one laminate fragment in the fill (Cat. 26A108) (Inomata and Murphy 2000). Subsequent excavations carried out in 2002 in conjunction with the Aguateca Restoration Project Second Phase yielded two fragments in wall debris in an area west of the same structure (Cat. 112B130) (Buechler 2003).

Related Finds

Ceramic laminate fragments have been found elsewhere at Aguateca and in other sites in the region, many of which were identified during a selective review of previously excavated collections (Beaubien 2004a). Excavations carried out in 1991 by the Petexbatun Regional Archaeological Project in an area to the north of Aguateca's main plaza produced several fragments later identified as the ceramic laminate material type. One fragment was found in association with Wall L7-5, a defensive wall connected to Structure L7-5; excavations in Structure L7-42 produced another in wall collapse in the central room (Inomata et al. 2001:294). In 1994, excavations carried out in sector K5, in the north periphery of the site, found three fragments south of Structure 22 in Group G-2.

In addition to the previously cited examples from its excavations at Aguateca, the Petexbatun Regional Archaeological Project investigated three other sites in the 1990s that yielded laminate fragments. Six fragments were found at Arroyo de Piedra, associated with Structure 13 (Escobedo 1997), and two were found at Tamarindito, associated with Structure 5 in Group A (Valdés 1997). The third site, Cueva de los Quetzales, was investigated by the Petexbatun Regional Cave Survey (a subproject) (Brady et al. 1997); three fragments, the first examples identified as having been made of a ceramic laminate material, were found in a deposit that formed beneath an opening situated in the main plaza of the site of Las Pacayas (Escobedo et al. 1994). Recent excavations, carried out under the aegis of the Aguateca Archaeological Project Second Phase at nearby sites, have also produced laminate fragments. A deposit of more than 50 fragments was found in Structure M4-1 at the site of Nacimiento, located to the south of Aguateca, during 2004 excavations (Eberl 2007). In 2006, three fragments were found in above-floor contexts associated with Structure R22-54 at Las Plataformas, located between Aguateca and Tamarindito (Buechler et al. 2007:235).

A single example was also identified among finds from the 1997 excavations in the patio of Group U-13 (PN 20G) at Piedras Negras, located in the Usumacinta River drainage of the Peten (Houston et al. 1998b). Thus far, this site is the only one outside the Petexbatun region in which ceramic laminate fragments have been found.

DISCUSSION

While the total number of objects represented by the ceramic laminate fragments known to date is still very small, those from Aguateca offer the most significant evidence of a well-developed craft technology that had heretofore gone unrecognized. The largest deposits point to a possible production location—in an elite household in the Causeway Area—as well as to storage and use contexts of the finished products in the Palace Group, as has been demonstrated elsewhere (e.g., Inomata 2001c; Inomata 2006a; Inomata and Triadan 2003).

Examination and selective analysis of the fragments found at Aguateca, as well as laboratory replication experiments, elucidated the fundamental characteristics and production steps of the ceramic laminate material. The survival, conservation, and in-depth study of the near-complete face mask afforded a rare opportunity to reconstruct the steps for fabricating an object from beginning to end. This item demonstrated that, in the hands of a skilled artisan, the ceramic laminate material was capable of being crafted into highly sculptural shapes, such as are typical of elite headdresses represented in other media, while possessing practical qualities well suited for such use, including lightness, rigidity, and water resistance. The face mask and grotesque headdress elements, in particular, represent a fabrication process that would favor the production of unique items vs. mold-made multiples, which seems appropriate considering the highly restricted context and nature of their use. This is potently reinforced by the example of the face mask, with the apparent use of a human skull as the form on which it was created.

The limited data set on which hypotheses about the production and use of ceramic laminates rest underscores several factors above and beyond rarity of occurrence that may be ascribed to elite contexts and craft practice organization. These include the material's inherent vulnerability (relative to cross-sectional thickness, firing temperature, and porosity), degradative factors in the burial environment, and further handling risks resulting from misclassification on excavation. The notable concentration of finds at Aguateca may suggest that the ceramic laminate material type was prominently utilized there, but it also highlights the site's favorable depositional circumstances, archaeological processing well tailored for comprehensive recovery, and conservation involvement, all of which had a positive impact on the recovery of this evidence from the site.

chapter

8

Bone and Shell Artifacts

Takeshi Inomata and Kitty Emery

The bone artifacts discussed here encompass vertebrate remains, including bones, teeth, claws, antlers, and turtle carapaces, whereas shell artifacts consist of invertebrate remains, including shell and coral. This chapter deals with intentionally worked or used objects for utilitarian, ornamental, or symbolic purposes, as well as their preforms and debitage, and excludes animal remains that do not show evidence of secondary use and are most likely the remains of food. The focus is on the production and use of these tools and ornaments by different social groups. Chapter 9 presents the results of species identification and other faunal analysis of all bones and shells, including artifacts and food refuse, and discusses their implications for subsistence, economy, and ritual. Emery originally analyzed individual fragments for faunal information (Emery 2003b, 2007b). Inomata later refitted bone artifacts and recorded additional artifact data, and Catherine Wetmore, along with Inomata, recorded and revised artifact data on shell ornaments. Because these analyses were carried out in multiple stages with refitting, there are some discrepancies in artifact counts taken by Emery and Inomata.

BONE ARTIFACTS

Most of the bone, tooth, and antler artifacts were manufactured from mammal remains (516 of 523), primarily from dog teeth (90 artifacts of 213 dog tooth specimens), the long bones of large mammals such as white-tailed deer (46 artifacts of 164 total deer long bone specimens including cannon bones), and those that could not be identified to species (114 artifacts of 554 large mammal long bone specimens). The deer bone artifacts are the most numerous for a single species (56) and were manufactured primarily from femurs (19), tibiae (10), and metapodials (8). Several cervid antlers show evidence of either artifactural modification or expedient use, likely in lithic tool manufacture or burnishing (2 cervid, 1 brocket deer, and 14 white-tailed deer antlers). Outside of the mammals, a very few artifacts (5) were formed from turtle carapace and/or plastron segments, and only two were made from bird bone (also long bone segments). The process of raw material modification during artifact production makes taxonomic and skeletal element identification very difficult since diagnostic portions are typically removed, so this evaluation does not represent a full understanding of the animals and skeletal elements involved in crafting using vertebrate skeletal elements (see Emery 2008, 2009 for a detailed discussion of bone crafting).

For the analysis of bone artifacts, we developed a classification system building on the work of the Aguateca Subproject of the Petexbatun Regional Archaeological Project (Willey 1972, 1978; Inomata 2007a; Emery 1997, 2010). The classification is primarily a morphological one with certain functional implications, but we believe that there is substantial functional variation within each category, and certain functions probably crosscut different categories. Table 8.1 presents the frequency of objects by category and area.

The category of elongated, pointed objects includes, in addition to those with a pointed end, fragments of long objects without an end with the assumption that they had a pointed end. In subcategories under this class, needles are defined by the presence of an eye through which a thread was passed (Figures 8.1a, 8.9b'). Pins are fine, pointed objects without an eye, and some of them have elaborate carvings near the end (Figures 8.1b–e; 8.7c; 8.8a', e'; 8.9t, v, y). We assume that they served mainly decorative purposes as hairpins or clothespins, but some of them may have been used for textile production. Only items that have substantial portions preserved can be securely identified as pins, and many small fragments were classified in the "needle or pin" category (Figure 8.1f–j). Awls are thick, pointed objects. Awls were designed for firmer grip and

TABLE 8.1. Distribution of Bone Artifacts.

			PALACE GROUP		CAUSEWAY AREA					BARRANCA ESCONDIDA	GRANADA GROUP
CATEGORY	SUBCATEGORY	TOTAL	22A	22B	23A	20A	14B&C	23B	21A	24A	26A&B
Elongated, pointed object	Needle with eye	3				3					
	Pin without eye (hairpin or clothespin)	6	1		2	3					
	Needle or pin, unclear	9	1	1	2	3		2			
	Awl	21	3	2	4	7	3	1	1		
	Awl or flaker	8			7				1		
	Needle, pin, awl, or flaker	3		1		1			1		
	Spatula	6			3	2	1				
	Beveled object	5			1	4					
	Other antler	4			4						
	Other elongated object	3			1	1	1				
	Not clear	54	4	5	10	16	8	3	4		4
	Subtotal	122	9	9	34	40	13	6	7	0	4
Tubular object	Rasp	8	1		3	4					
	Perforated tubular object	3	1			2					
	Not clear	7			1		3	1	2		
	Subtotal	18	2	0	4	6	3	1	2	0	0
Other utilitarian object	Fish hook	1					1				
	Not clear	1							1		
	Subtotal	2	0	0	0	0	1	0	1	0	0
Other ornament, toy, etc.	Pendant, bead, necklace, belt, bracelet, anklet with hole	24 (220)	4 (98)	6 (30)	5 (31)	5 (49)		1 (2)	3 (10)		
	Small ornament without hole	6 (27)	2 (7)		4 (20)						
	Disk with holes	1								1	
	Disk, unclear	3	1		1		1				
	Possible pectoral	2	2								
	Elaborately carved long bone	8	2	1	3			2			
	Other object with elaborate carving	3			1	1	1				
	Turtle shell	6			3	2		1			
	Unworked long bone	5	1		1			1	2		
	Not clear	9 (16)	5 (12)		1		3				
	Subtotal	67 (291)	17 (123)	7 (31)	19 (61)	8 (52)	5	5 (6)	5 (12)	1	0
Undetermined	Undetermined	7			3	2			2		
Total		216 (440)	28 (134)	16 (40)	60 (102)	56 (100)	22	12 (13)	17 (24)	1	4

Note: Multiple pieces possibly forming an ornament such as a necklace are counted as one. Totals in parentheses indicate the total numbers of individual pieces. The table does not include pieces found in construction fill, food refuse, or debitage.

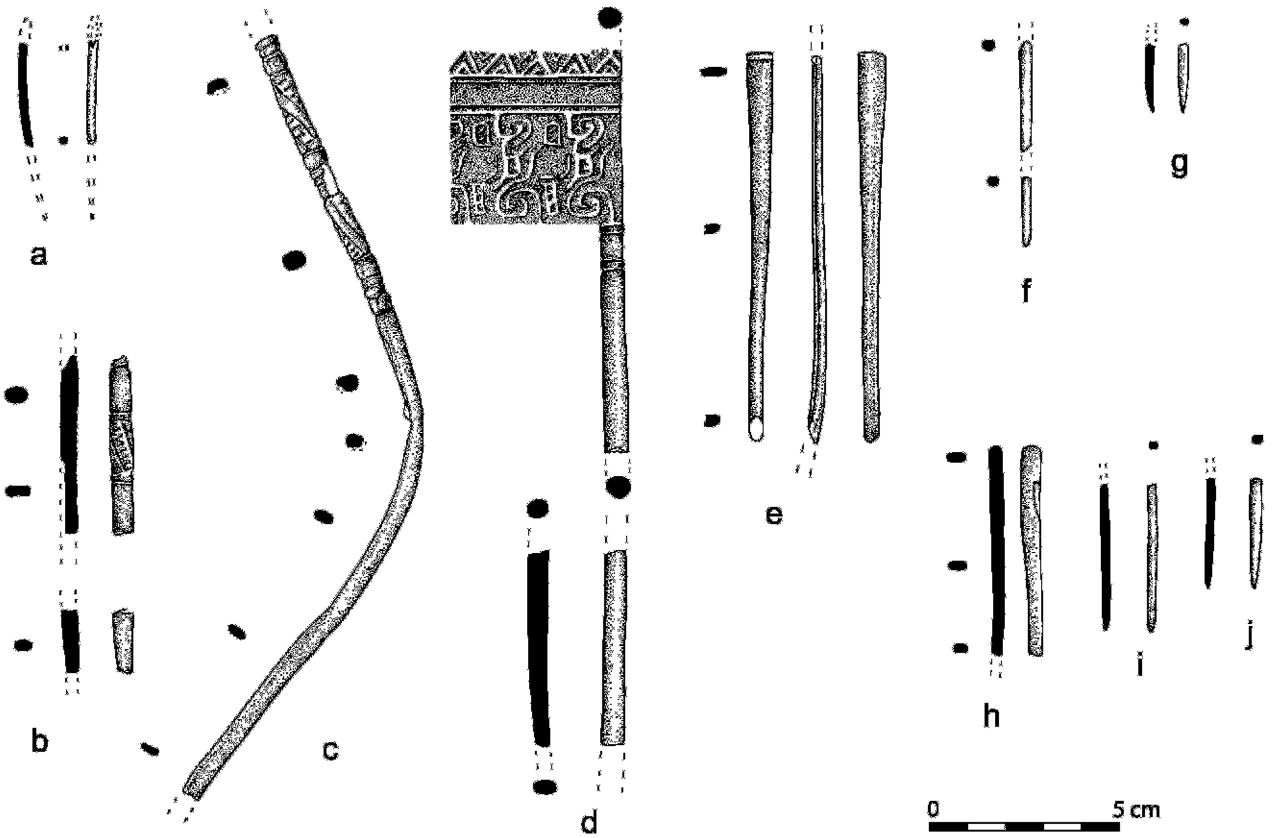


FIGURE 8.1. Elongated, pointed bone artifacts. (a) Needle. 20A35-3-1, Cat. 1683-10. (b–e) Pins. (b) 22A45-3-1, Cat. 1037-15. (c) 23A42-3-2, Cat. 1839-38. (d) 23A42-3-4, Cat. 2002-532. (e) 20A29-3-3, Cat. 1355-1. (f–j) Needles or pins. (f) 22B13-3-1, Cat. 494-7. (g) 23A32-3-3, Cat. 1882-9. (h) 20A12-3-1, Cat. 824-1. (i) 20A17-3-4, Cat. 721-1. (j) 20A17-3-3, Cat. 717-1.

higher pressure than pins, and we assume that they served primarily utilitarian purposes, particularly the production of textiles, baskets, and leather objects, as well as the kerneling of corn (Hayden and Cannon 1984) (Figures 8.2; 8.7r, w; 8.8b'–d'; 8.9g, s, w; 8.10h'–l'; 8.11b, d, n, x, i').

The distinction between pins and awls remains vague and subjective. Awls are generally thicker, blunter, and less refined than pins, often produced and used expediently. However, three possible awls from the easternmost room of Structure M7-22 (House of Masks) are thinner and more delicately made than others (Cat. 22A790-109, 22A790-111, 22A803-92; Figures 8.2a–c, 8.7f–h). Given the room's probable function as a royal storage chamber, these objects may have been bloodletters used by royal family members. Although these pieces do not have carved decorations, a similar bone artifact found in Structure M7-35 during the Petexbatun Project exhibits a series of incisions that imitate a stingray spine (Inomata 1995:Figure 8.69a). A small fragment of a stingray spine found in the center room of Structure M8-4 (Cat. 23A717-1) was probably part of a bloodletter (Figure 8.8k). Flakers are pointed objects for indirect percussion and pressure flaking in lithic production, but we could not identify them with reasonable certainty. These are classified in the "awl or flaker" category, and some objects identified as awls may have been used for flaking (Figures 8.2q; 8.8q, r).

Spatulas are objects with a flat end which may have been used for textile production and other manufacturing purposes, but some of them may have served as pins for clothing or hair (Figures 8.3a–d; 8.8e; 8.10l; 8.11e, i). Beveled objects have a beveled end from abrasion, which most likely resulted from manufacturing activities (Figures 8.3e–g; 8.8f; 8.10g, h, n, o). The category of "other antler" includes deer antlers that appear to have been nearly complete or unworked before the abandonment whereas worked antlers were usually classified as awls, flakers, or other types of elongated objects. All four examples of nearly complete or unworked antlers were from Structure M8-4. Some of them may have been awls, other utilitarian objects, or raw materials for tool production, but others may have served as symbolic objects, such as part of a mask representing a deer or a deer deity (see Brown 1996;

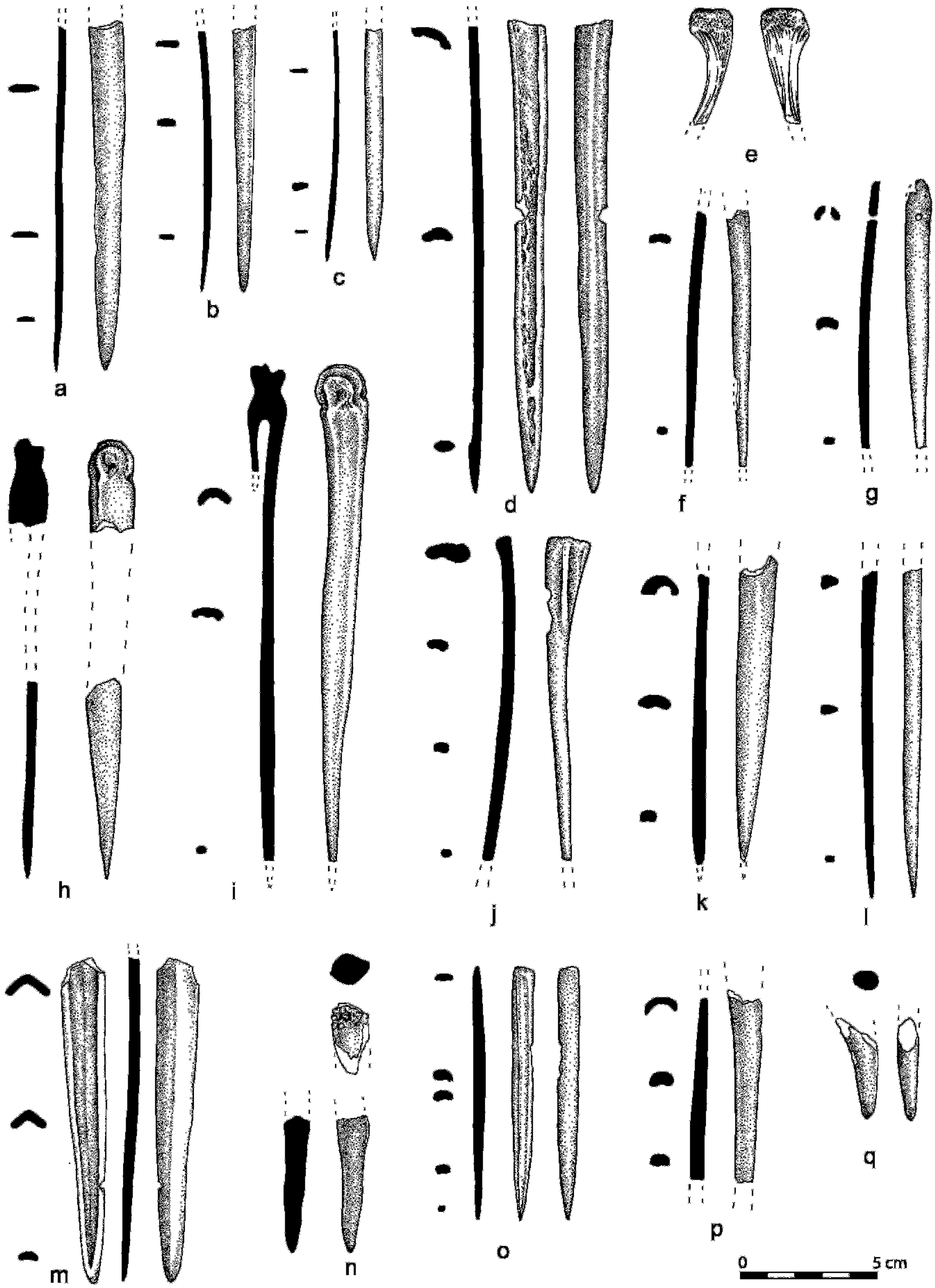


FIGURE 8.2. Probable bone awls. (a–c) Awls or bloodletters. 22A10-3-1. (a) Cat. 790-109. (b) Cat. 790-111. (c) Cat. 803-92. (d–p) Awls. (d) 22B51-2-3, Cat. 486-1. (e) 22B13-3-1, Cat. 460-11. (f) 23A44-3-2, Cat. 1225-1. (g) 23A44-3-3, Cat. 1611-3. (h) 20A8-3-3, Cat. 690-1. (i) 20A8-3-3, Cat. 687-6. (j) 20A23-3-1, Cat. 1342-10. (k) 20A8-3-3, Cat. 659-5. (l) 20A8-3-3, Cat. 688-7. (m) 20A32-2-1, Cat. 1318-2. (n) 20A31-2-2, Cat. 1337-1. (o) 14B3-3-1, Cat. 484-1. (p) 21A39-3-4, Cat. 573-1. (q) Awl or flaker. 23A30-3-2, Cat. 1968-5.

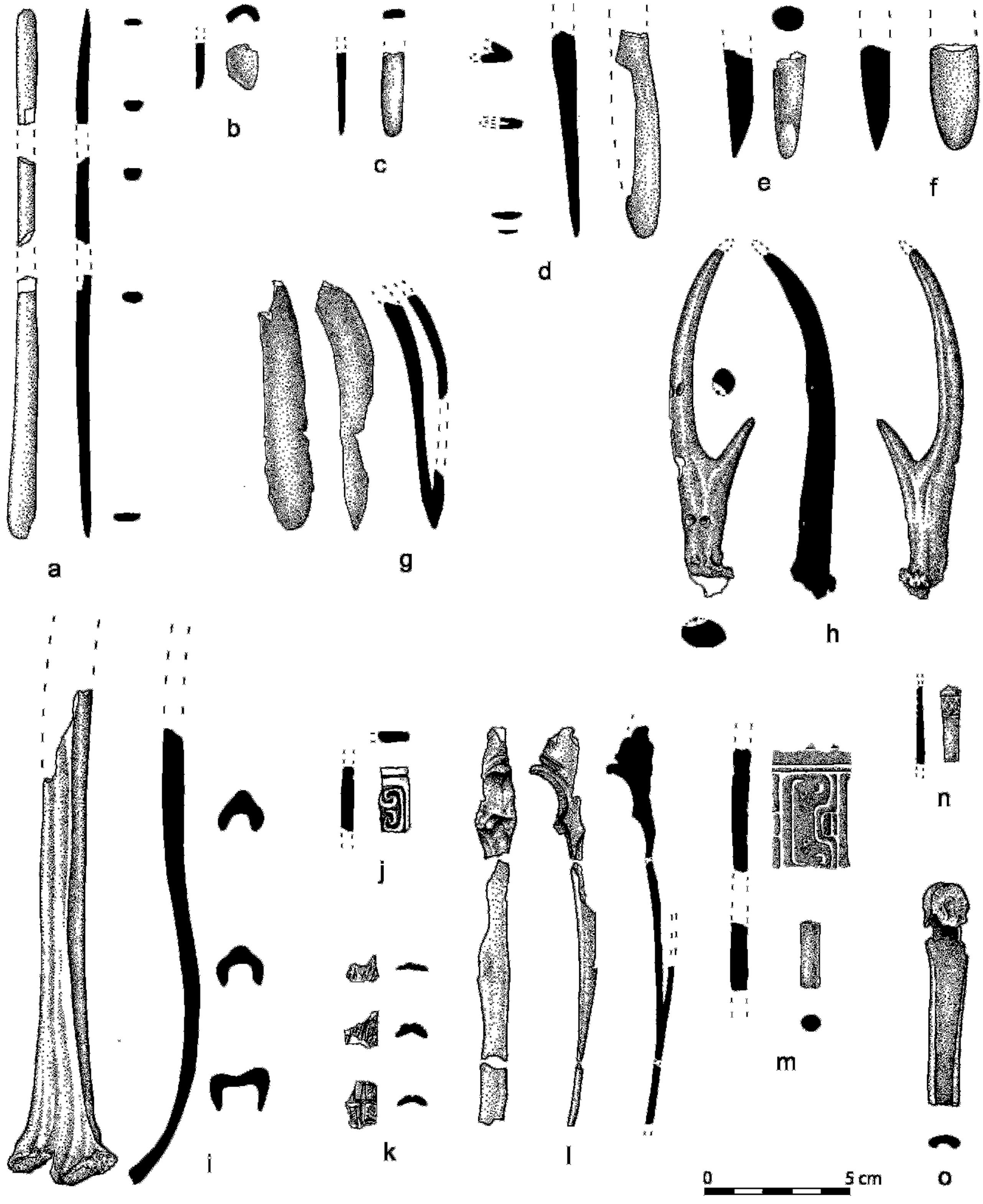


FIGURE 8.3. Bone spatulas, beveled objects, other elongated object, and unclear elongated, pointed objects. (a–d) Spatulas. (a) 20A2-3-1, Cat. 387-2. (b) 23A32-2-2, Cat. 1253-1. (c) 14B2-2-2, Cat. 183-1. (d) 14B2-3-6, Cat. 333-1. (e–g) Beveled objects. (e) 23A13-3-1, Cat. 1923-4. (f) 20A3-3-2, Cat. 374-1. (g) 20A6-3-1, Cat. 479-95. (h) Other antler. 23A44-3-1, Cat. 1303-1. (i) Other elongated object. 20A9-3-2, Cat. 686-4. (j–o) Unclear elongated, pointed objects. (j) 23A43-3-4, Cat. 1357-11. (k) 23A32-3-1, Cat. 1993-10. (l) 20A38-3-3, Cat. 1333-1. (m) 20A24-3-2, Cat. 1400-1. (n) 20A27-3-2, Cat. 1306-2. (o) 14B2-3-3, Cat. 322-6.

Taube 2003; Vail 1997) (Figure 8.8w, x). Cat. 23A1303-1 is a nearly complete brocket deer antler with a missing tip and two perforations (Figures 8.3h, 8.8y). Similar perforated antlers are reported from Tikal (Moholy-Nagy 2003:Figure 126a). Some pictorial scenes show deer antlers used as beaters for turtle carapace drums (Bonampak murals, Room 1; K3040, K3041, and K5104; see below). We should note that some antlers were found close to turtle carapaces: Cat. 23A1137-59 with Cat. 23A2042-4 in the north room of Structure M8-4, and Cat. 23A439-14 with Cat. 23A498-3 in the south room of Structure M8-4.

One unique artifact with an unclear function is a long bone that was cut longitudinally and smoothed to have a spoon-like curved end. It is not clear whether the other end was pointed (Cat. 20A686-4; Figures 8.3i, 8.10o'). Cat. 14B333-1 is also a long bone with a flat end (Figure 8.11e). Many other small fragments and artifacts that were missing a pointed end were classified as unclear elongated, pointed objects (Figures 8.3j–o, 8.9m).

Tubular objects include cut sections of long bones. Rasps have parallel deep grooves at a right angle to the long axis on one side of tubular bones (Figures 8.4a; 8.7p; 8.8p; 8.9c; 8.10q, v–x). Similar artifacts are reported from various sites, including Altar de Sacrificios (Willey 1972: 234), Ceibal (Willey 1978:169–170), Tikal (Moholy-Nagy 2003a:Figure 124), Piedras Negras (Coe 1959:61, Figure 55m–o), Uaxactun (Ricketson and Ricketson 1937:206, Figure 133), Mayapan (Shook and Irving 1955:150, Figure 6m; Thompson 1954:79), Tonina (Becquelin and Taladoire 1990:Figure 176a), Altun Ha (Pendergast 1990: Figure 88), and the highlands site of Quen Santo (Seler and Lehmann 1901:152–158, Figure 226). It is generally assumed that these artifacts were used as musical instruments, but there is no unequivocal evidence. Perforated tubular objects have a series of holes on one side and may have served as flutes or pendants (Figures 8.4b, c; 8.7q; 8.10d, u). Smaller fragments without clear evidence of incisions or perforations are classified as unclear tubular objects (Figure 8.4d). Other probable utilitarian objects include a fishhook-shaped artifact (Figures 8.4e, 8.11o). Similar objects were found in Structures M8-10 and M7-35 during the Petexbatun Project (Inomata 1995:Figures 8.43e, 8.69c), as well as at Altar de Sacrificios (Willey 1972: Figure 203c), but it is not clear whether these artifacts were used for fishing.

The category of ornaments and toys includes elaborately carved pieces as well as other items with unclear functions. Possible pendants, beads, necklaces, belts, bracelets, and anklets with holes include animal teeth pierced at the root and ornaments made of bone (Figures 8.7l–o, b'–d'; 8.8u, l'; 8.9n–p; 8.10p–r; 8.11a', k', l'). Pieces with one or two perforations that were attached to a headdress or clothing may also be classified in this category. Similar beads and other pieces from the same area are considered part of the same necklace, wrist band, belt, or anklet, and counted as one. The numbers in parentheses in Table 8.1 represent the frequencies of individual beads and other pieces. Many of the ornaments made of teeth were of canines or felines, usually measuring 2 to 3.5 cm in length. Some unperforated teeth were classified in this category when they were found with perforated ones. It is not clear whether unperforated teeth were parts of strung ornaments, pieces embedded in masks or headdresses, or raw materials for future manufacturing. Small ornaments without holes may have been attached to clothing and headdresses, although there remains a possibility that these are unfinished products in the process of being manufactured.

Several bone pieces found in Structure M8-4 (House of Mirrors) had one polished, rounded end, and their other ends were cut and snapped but not polished. Some of them had notches near the unpolished end, but others were without notches. The 10 pieces in Cat. 23A652-73, measuring 1.8 to 2.5 cm in length, exhibit heavily burned polished ends and less severely burned unpolished ends (Figures 8.4f, 8.8s). This pattern indicates that these pieces were probably embedded in leather or wood on their unpolished ends. They were found on the bench of the south room and may have been parts of a headdress along with the Jester God ornament and recycled pyrite pieces that were recovered in the same area. The 7 pieces in Cat. 23A553-1 have shapes similar to those of Cat. 23A652-73 but are slightly smaller, measuring 1.3 cm in length (Figures 8.4g, 8.8t). They were found scattered in various parts of the south room and do not show traces of differential burning. Cat. 23A1142-1 (2 pieces; Figures 8.4h, 8.8o) and 23A2098-5 (1 piece; Figure 8.4i) are roughly the same size as Cat. 23A652-73 and were found in the center room. It is not clear whether these smaller pieces formed parts of the same headdress as Cat. 23A553-1. Because some pyrite artifacts are polished and others are not, the headdress may have been in the process of being refurbished, and some of these bone pieces may not yet have been attached to it. Similar bone artifacts were found in the easternmost room (the royal storage room) of Structure M7-22 (House of Masks). The 4 pieces of Cat. 22A864-1, found

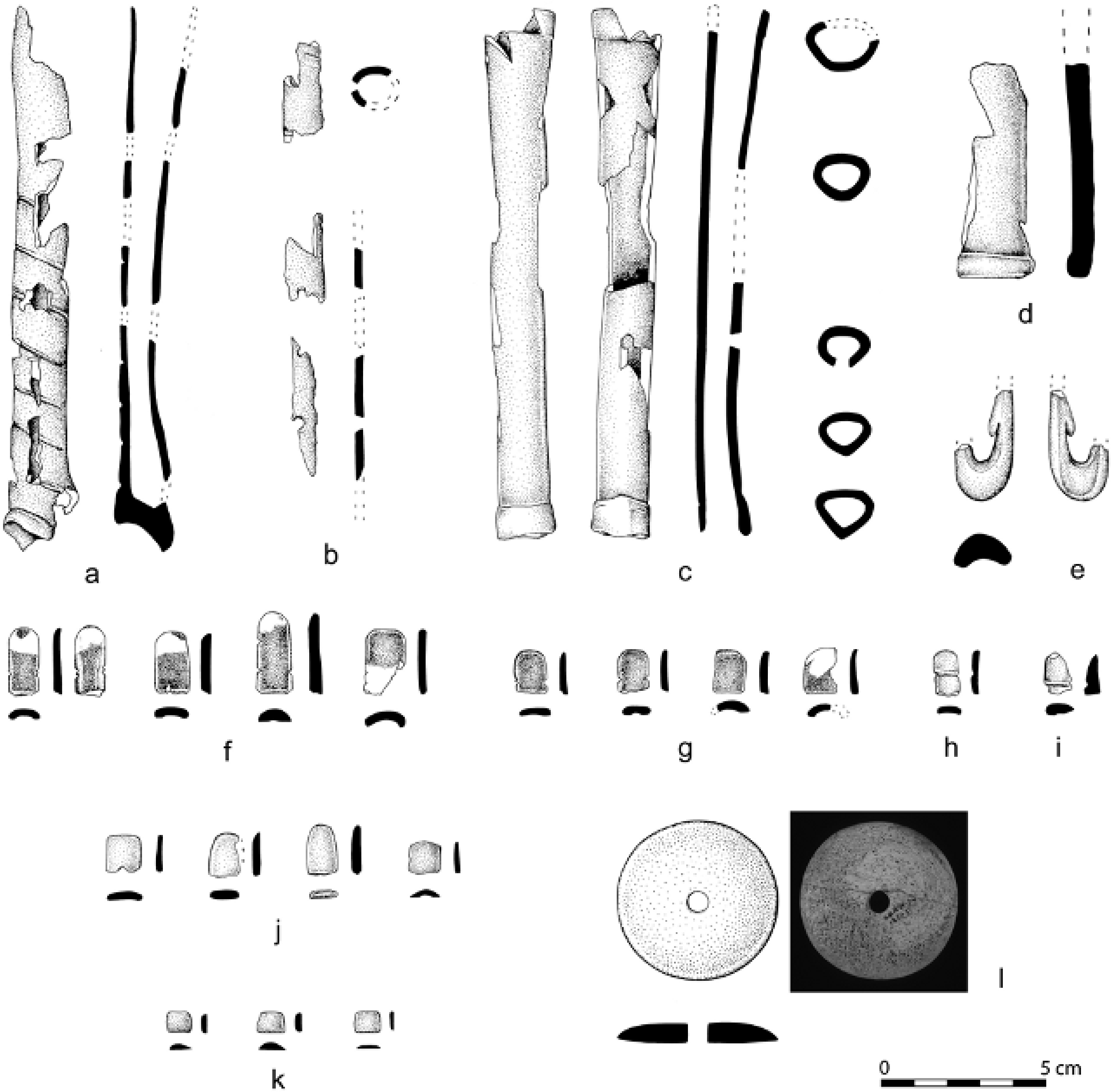


Figure 8.4. Tubular bone objects, small bone ornaments without holes, and a bone disk. (a) Rasp. 20A38-3-3, Cat. 1333-2. (b–c) Perforated tubular objects. (b) 22A6-3-3, Cat. 726-2. (c) 20A24-3-2, Cat. 1286-3. (d) Unclear tubular object. 14B28-3-1, Cat. 813-1. (e) Possible fish hook. 14B26-3-3, Cat. 878-1. (f–k) Small ornaments without holes, including armadillo scutes (k). (f) 23A5-3-2, Cat. 652-73. (g) 23A28-3-3, Cat. 553-1. (h) 23A13-2-1, Cat. 1142-1. (i) 23A14-3-4, Cat. 2098-5. (j) 22A14-3-3, Cat. 864-1. (k) 22A10-2-7, Cat. 638-37. (l) Bone disk. 24A14-1-1, Cat. 181-1.

near the northern corner in front of the bench near the ceramic laminate mask (Cat. 22A862-1), are similar to those from Structure M8-4 and may have been part of the mask or an associated headdress (Figures 8.4j, 8.7e). The 3 pieces of Cat. 22A638-37, found in the central part of the area in front of the bench, are smaller than the others (0.7–0.8 cm in length) and were identified as armadillo scutes by Emery (Figures 8.4k, 8.7d). It is not clear if they were part of a mask or headdress.

A round disk with a hole made of a turtle carapace or plastron was found in the Cliff Chasm of the Barranca Escondida (Cat. 24A14-1-1, Figure 8.4l). It is well polished and measures 4.9 cm in diameter and 0.6 cm in thickness. It may have served as a spindle whorl, but its diameter is

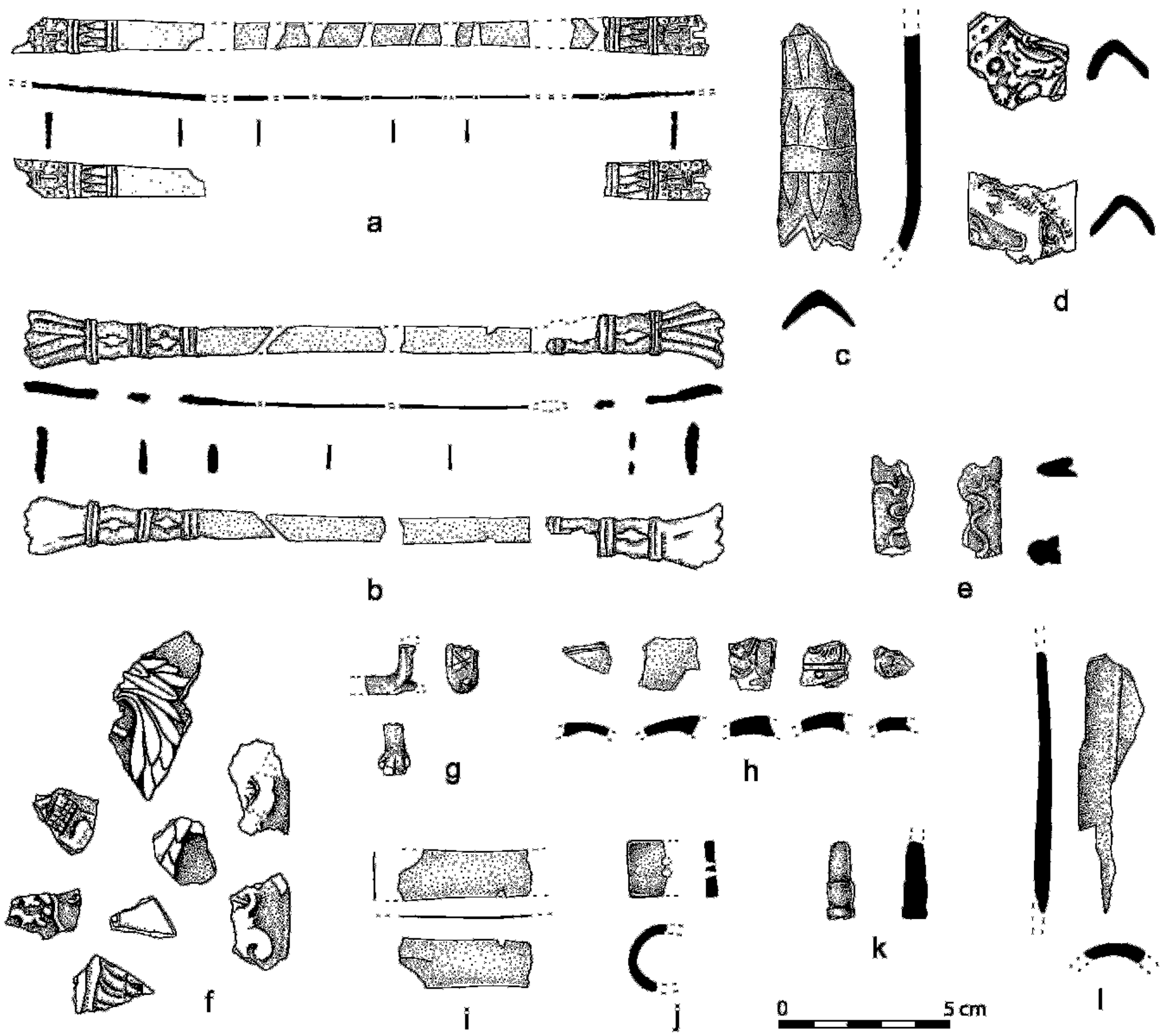


FIGURE 8.5. Elaborately carved bone objects. (a–b) Possible pectorals. (a) 22A14-3-1, Cat. 812-1. (b) 22A10-3-1, Cat. 801-71. (c–e) Elaborately carved long bones. (c) 22B5-3-7, Cat. 231-3. (d) 23A46-3-2, Cat. 2064-2. (e) 23B15-3-1, Cat. 291-1. (f–h) Other elaborately carved bones. (f) 23A46-3-1, Cat. 2104-5. (g) 20A13-3-4, Cat. 859-1. (h) 14B18-2-2, Cat. 345-7. (i–l) Possible ornaments or toys with unclear function. (i) 22A10-3-2, Cat. 835-9. (j) 14B26-3-3, Cat. 916-4. (k) 14B10-3-1, Cat. 506-1. (l) 23A12-3-1, Cat. 717-1.

substantially larger than those of the stone and ceramic spindle whorls found at Aguateca. Given its context, it may have been an ornament or ritual object. Similar artifacts are reported from Tikal (Moholy-Nagy 2003a:Figure 122; Laporte 1988) and Altun Ha (Pendergast 1990: Figure 11a, b).

An important group of bone artifacts within the category of possible ornaments and toys is made up of probable pectorals, elaborately carved long bones, and other types of elaborately carved objects. Two long bone artifacts (Cat. 22A812-1 and 22A801-71) found in the easternmost room of Structure M7-22 were probably pectorals used by the last ruler of Aguateca (Figures 8.5a, b; 8.7j, k). They were found close together near the closed doorway of the royal storage room. They are finely carved on both sides and are 0.08 cm thick in the midsections. Cat. 22A801-71 is nearly complete and measures roughly 20.5 cm in length. Cat. 22A812-1, which is missing both ends, was originally slightly longer. Traces of red paint are visible on carved parts of Cat. 22A801-71. Similar long horizontal pectorals are commonly depicted on Maya monuments, including Copan Altar Q; Tikal Stela 16; Piedras Negras Stelae 6, 8, and 11; Yaxchilan Lintels 13, 14, and 32; and Ceibal Stela 9. The rulers of Dos Pilas–Aguateca certainly used similar

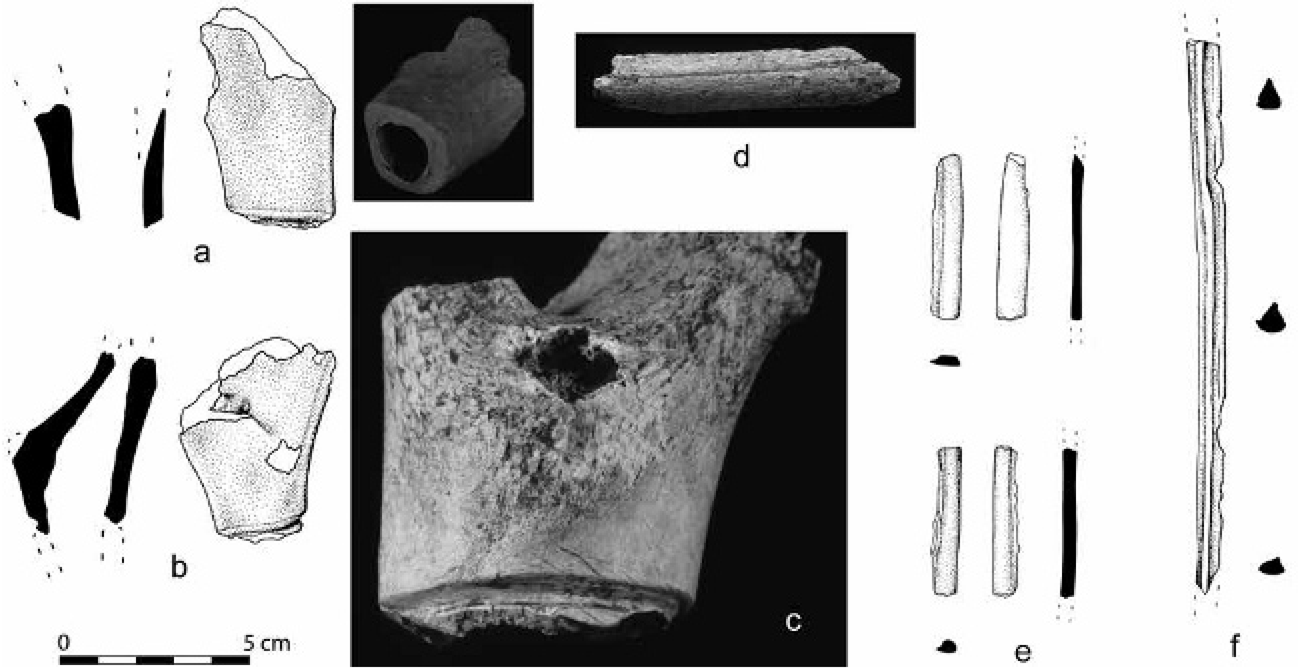


Figure 8.6. Bone debitage and preforms. (a–d) Debitage. (a) 14A2-4-1, Cat. 110-1. (b–c) 14B13-1-3, Cat. 154-1. (c) Close up (not to scale). (d) 14B13-1-3, Cat. 154-3. (e–f) Preforms. (e) 20A16-3-2, Cat. 745-1. (f) 22A10-3-1, Cat. 806-69.

pectorals, as seen in Aguateca Stela 7 and Dos Pilas Stelae 11 and 15. These bone pectorals may have been imitations of those made of jade, but the red paint suggests that they represent aesthetic and symbolic values different from those of jade pectorals.

Elaborately carved long bones include those carved with glyphs: Cat. 22A524-8 and 22A332-2 from the easternmost room of Structure M7-22 (Figures 13.4, 13.5), Cat. 23B191-1 from Structure M8-2 (Figure 13.6a), and Cat. 23A1121-7 and 23A1121-1 (Figures 8.8a, c; 13.6b, c) from the center room of Structure M8-4. They may have been scepters or other ceremonial objects. More detailed discussions of these texts are presented in Chapter 13. Other elaborately carved long bones include Cat. 22B231-3, 23A2064-2, and 23B291-1 (Figures 8.5c–d, 8.7s, 8.8b). Cat. 23A2064-2 may be part of Cat. 23A1121-1 or 23A1121-7, and Cat. 23B291-1 may be part of Cat. 23B191-1. Other objects with elaborate carvings include Cat. 23A2104-5, 20A859-1, and 14B345-7 (Figures 8.5f–h, 8.8d, 8.10a). Cat. 23A2104-5 appears to have been a thin plaque with carvings on both sides, and seems to show a person with ceremonial attire. Cat. 20A859-1 appears to represent a hand. Cat. 14B345-7, found in the midden behind Structure M8-13, consists of carved turtle shell fragments, and it is not clear whether it was originally used as a complete carapace.

The category of turtle shell includes probable complete or nearly complete turtle shells, although most of them were badly fragmented and the original shapes and dimensions are not clear. Only one small turtle shell from Structure M8-8 (Cat. 20A1345-7, Figure 8.10s, t) was reconstructed by Beaubien. This object has two perforations at one end. Various ceramic and mural paintings show that turtle carapaces were used as drums and rattles along with deer antlers (e.g., K3040, K3041, and K5104; Bonampak murals, Room 1; see above). Some artifacts with unknown functions were classified in the category of other ornaments or toys (Figure 8.5i–l). Cat. 22A835-9, found in the easternmost room of Structure M7-22, is similar to the midsections of the possible pectorals, Cat. 22A812-1 and 22A801-71, but does not seem to belong to them. Eight unperforated animal teeth found in this royal storage room may have been parts of masks or headdresses.

Debitage are bone pieces discarded in the process of artifact production (Figures 8.7y, z; 8.8n, v, o', p'). Some of them have longitudinal cuts or incisions (Figures 8.6d, 8.8n'), and others are ends of long bones that had been cut off (Figures 8.6a–c, 8.8j). Preforms refer to roughly shaped pieces in the process of production (Figure 8.7x). Cat. 20A745-1 may be a preform for a pin; it shows the rough edge that was cut and snapped but not polished (Figures 8.6e, 8.10n'). Cat. 23A1993-5 is a long bone with one end cut off but does not show other evidence of

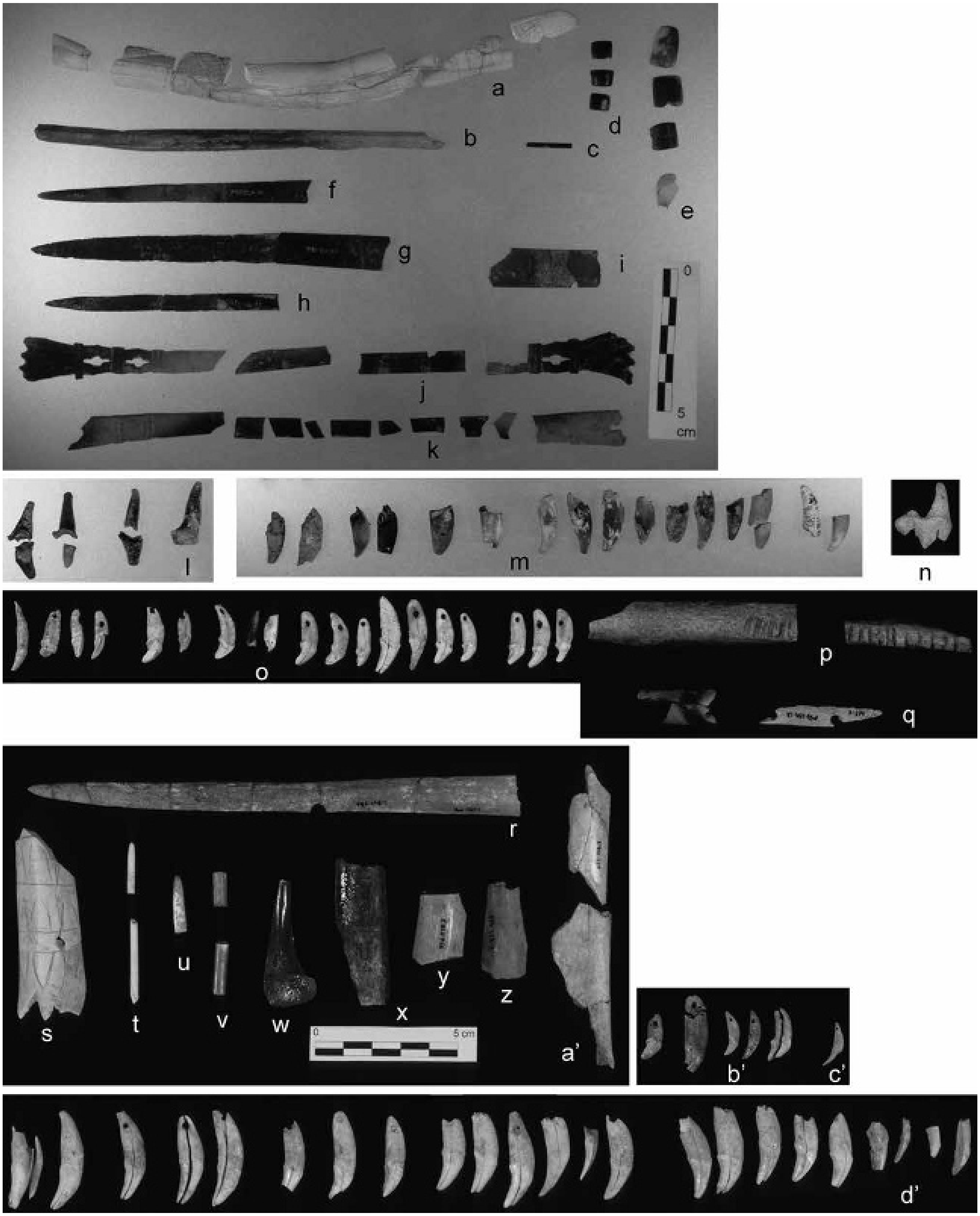


FIGURE 8.7. Bone artifacts from Structures M7-22 and M7-32. (a–n) Artifacts from the easternmost room of Structure M7-22. (a) 22A14-2-5, Cat. 332-2. (b) 22A10-3-1, Cat. 806-69. (c) 22A10-2-8, Cat. 731-564. (d) 22A10-2-7, Cat. 638-37. (e) 22A14-3-3, Cat. 864-1. (f) 22A10-3-1, Cat. 790-111. (g) 22A10-3-1, Cat. 790-109. (h) 22A10-3-1, Cat. 803-92. (i) 22A10-3-2, Cat. 835-9. (j) 22A10-3-1, Cat. 801-71. (k) 22A14-3-1, Cat. 812-1. (l) 22A10-3-3, Cat. 863-3. (m) 22A10-3-1, Cat. 828-75. (n) 22A10-3-3, Cat. 514-1. (o–q) Artifacts from other parts of Structure M7-22. (o) 22A6-3-3, Cat. 726-5. (p) 22A45-3-1, Cat. 1137-18. (q) 22A6-3-3, Cat. 726-2. (r–d') Artifacts from Structure M7-32. (r) 22B51-2-3, Cat. 486-1. (s) 22B5-3-1, Cat. 231-3. (t) 22B13-3-1, Cat. 494-7. (u) 22B43-3-3, Cat. 537-27. (v) 22B3-3-2, Cat. 184-9. (w) 22B13-3-1, Cat. 460-11. (x) 22B18-3-3, Cat. 556-1. (y) 22B18-3-3, Cat. 556-1. (z) 22B18-3-3, Cat. 556-2. (a') 22B54-3-1, Cat. 624-4. (b') 22B54-3-2, Cat. 649-3. (c') 22B3-3-2, Cat. 184-8. (d') 22B42-3-3, Cat. 430-19.

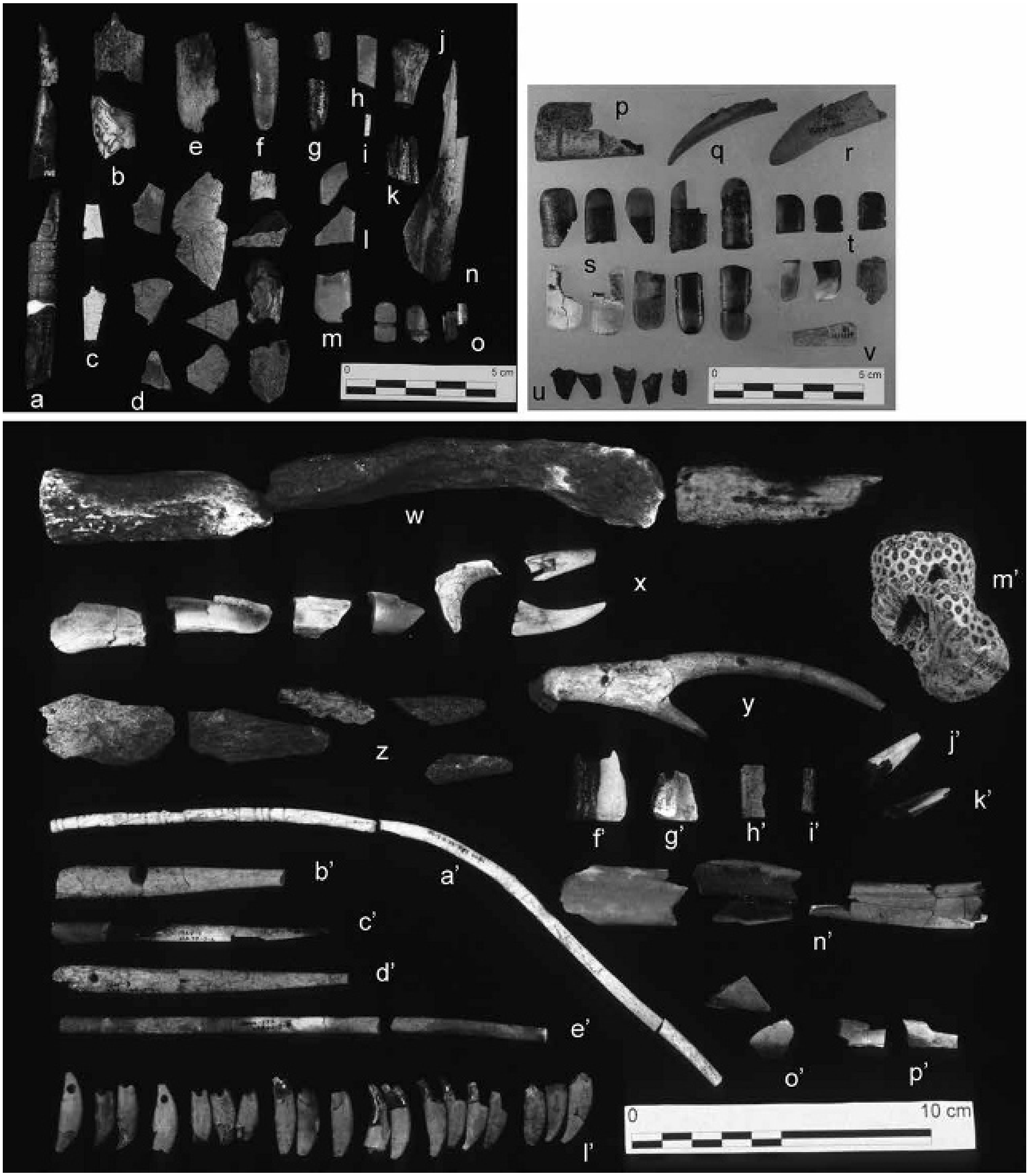


FIGURE 8.8. Bone artifacts from Structure M8-4. (a–o) Artifacts from the center room. (a) 23A13-3-1, Cat. 1121-7. (b) 23A46-3-2, Cat. 2064-2. (c) 23A13-3-1, Cat. 1121-1. (d) 23A46-3-1, Cat. 2104-5. (e) 23A13-3-1, Cat. 1923-3. (f) 23A13-3-1, Cat. 1923-4. (g) 23A13-3-1, Cat. 1923-5. (h) 23A13-3-1, Cat. 1923-2. (i) 23A9-3-1, Cat. 1921-4. (j) 23A14-3-4, Cat. 2098-9. (k) 23A12-3-1, Cat. 717-1. (l) 23A14-3-1, Cat. 2075-1. (m) 23A14-3-2, Cat. 2004-1. (n) 23A12-2-1, Cat. 317-1. (o) 23A13-2-1, Cat. 1142-1. (p–v) Artifacts from the south room. (p) 23A28-3-2, Cat. 545-1. (q) 23A6-3-4, Cat. 442-5. (r) 23A6-3-4, Cat. 442-4. (s) 23A5-3-2, Cat. 652-73. (t) 23A28-3-3, Cat. 553-1. (u) 23A6-3-4, Cat. 442-3. (v) 23A6-3-4, Cat. 657-1. (w–p') Artifacts from the north room. (w) 23A443-1, Cat. 1538-9. (x) 23A41-3-3, Cat. 1137-59. (y) 23A44-3-1, Cat. 1303-1. (z) 23A23A17-3-1, Cat. 1156-7. (a') 23A42-3-2, Cat. 1839-38. (b') 23A44-3-1, Cat. 1768-8. (c') 23A44-3-1, Cat. 1225-1. (d') 23A44-3-3, Cat. 1611-3. (e') 23A42-3-4, Cat. 2002-532. (f') 23A17-3-1, Cat. 1156-2. (g') 23A44-3-1, Cat. 1303-6. (h') 23A43-3-4, Cat. 1357-11. (i') 23A43-3-4, Cat. 1371-13. (j') 23A17-3-1, Cat. 1156-4. (k') 23A17-3-1, Cat. 1156-3. (l') 23A42-3-2, Cat. 2001-19. (m') 23A42-3-4, Cat. 1843-533. (n') 23A41-3-1, Cat. 1132-6. (o') 23A41-3-1, Cat. 1136-2. (p') 23A42-3-1, Cat. 1266-3.

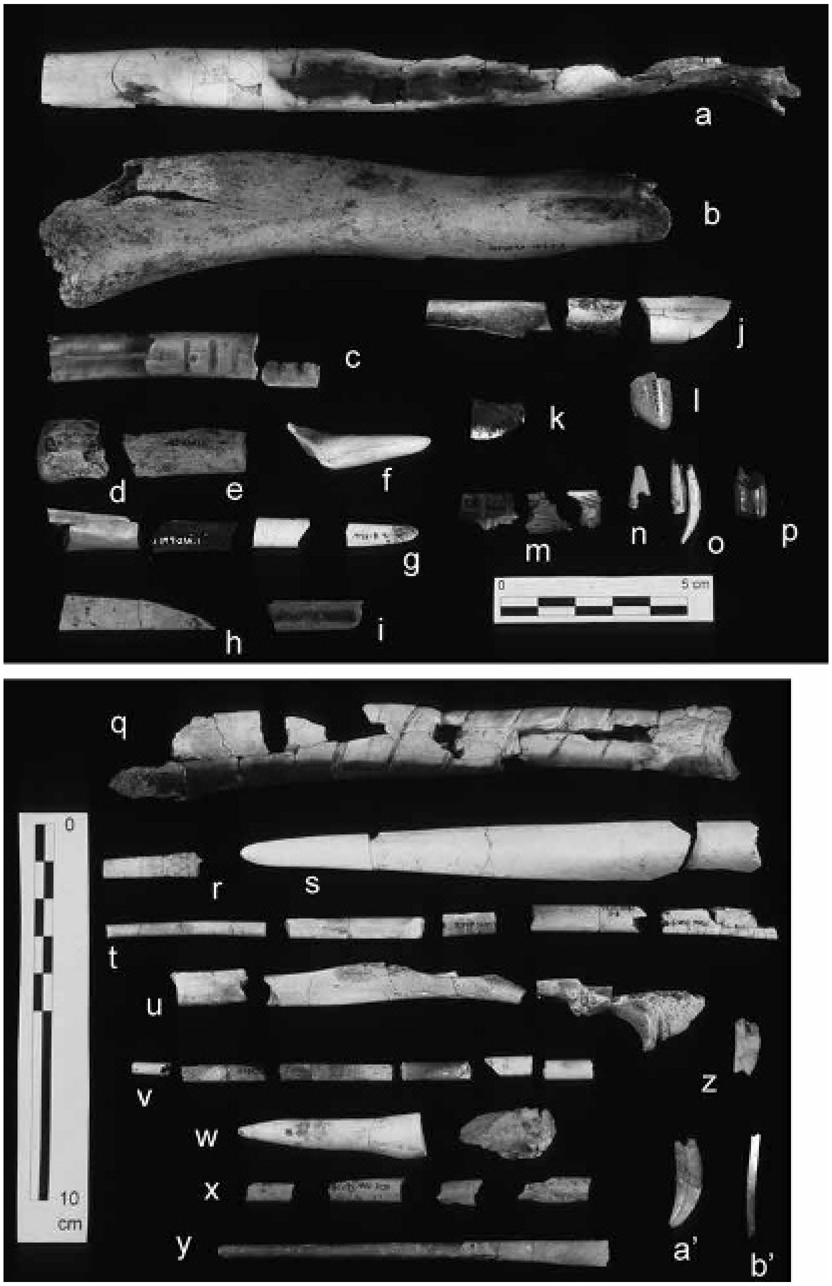


Figure 8.9. Bone artifacts from Structures M8-4 and M8-8. (a–p) Artifacts from the north addition of Structure M8-4. (a) 23A32-3-1, Cat. 1993-5. (b) 23A22-3-2, Cat. 1474-2. (c) 23A30-3-2, Cat. 1734-39. (d) 23A32-3-1, Cat. 1483-1. (e) 23A30-1-2, Cat. 182-1. (f) 23A30-3-2, Cat. 1968-5. (g) 23A32-3-1, Cat. 1716-4. (h) 23A30-3-2, Cat. 2092-4. (i) 23A21-3-2, Cat. 1525-1. (j) 23A21-3-2, Cat. 1606-7. (k) 23A38-2-1, Cat. 1324-1. (l) 23A32-2-2, Cat. 1253-1. (m) 23A32-3-1, Cat. 1993-10. (n) 23A30-3-2, Cat. 1968-9. (o) 23A21-3-1, Cat. 1617-1. (p) 23A38-3-4, Cat. 1453-1. (q–b') Artifacts from the south room, south addition, and south side of Structure M8-8. (q) 20A38-3-3, Cat. 1333-2. (r) 20A27-3-2, Cat. 1306-2. (s) 20A32-2-1, Cat. 1318-2. (t) 20A27-3-2, Cat. 1306-5. (u) 20A38-3-3, Cat. 1333-1. (v) 20A27-3-2, Cat. 1370-1. (w) 20A31-2-2, Cat. 1337-1. (x) 20A32-3-2, Cat. 1512-3. (y) 20A29-3-3, Cat. 1355-1. (z) 20A37-3-2, Cat. 1276-1. (a') 20A32-3-2, Cat. 1511-2. (b') 20A35-3-1, Cat. 1683-10.

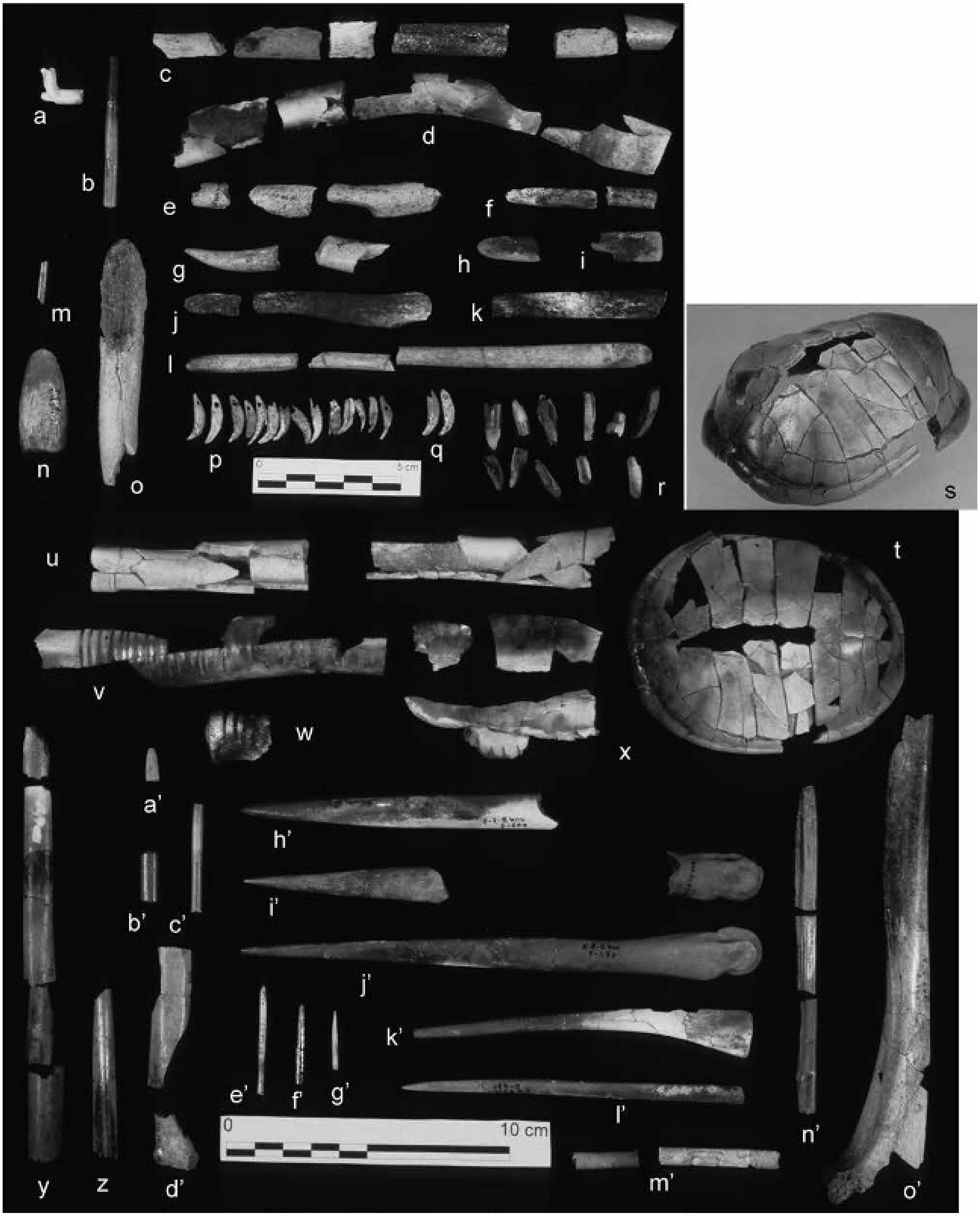


Figure 8.10. Bone artifacts from Structure M8-8. (a–b) Artifacts from the north addition. (a) 20A13-3-4, Cat. 859-1. (b) 20A12-3-1, Cat. 824-1. (c–r) Artifacts from the north room. (c) 20A19-3-4, Cat. 942-1. (d) 20A5-3-3, Cat. 252-37. (e) 20A2-1-1, Cat. 101-1. (f) 20A18-3-1, Cat. 963-1. (g) 20A6-3-1, Cat. 362-2. (h) 20A3-3-2, Cat. 375-2. (i) 20A17-3-1, Cat. 914-1. (j) 20A3-3-2, Cat. 374-2. (k) 20A3-3-2, Cat. 375-3. (l) 20A2-3-1, Cat. 387-2. (m) 20A5-3-1, Cat. 389-6. (n) 20A3-3-2, Cat. 374-1. (o) 20A6-3-1, Cat. 479-95. (p) 20A2-3-1, Cat. 474-56. (q–r) 20A19-3-5, Cat. 1018-3. (s–o') Artifacts from the center room and the area behind the structure. (s–t) 20A22-3-1, Cat. 1345-7. (u) 22A24-3-2, Cat. 1286-3. (v) 20A6-3-4, Cat. 784-1. (w) 20A24-3-3, Cat. 1207-1. (x) 20A6-2-2, Cat. 1041-3. (y) 22A17-3-4, Cat. 756-3. (z) 22A6-3-4, Cat. 785-1. (a') 20A24-3-1, Cat. 1206-2. (b') 22A24-3-1, Cat. 1206-3. (c') 22A9-3-2, Cat. 758-1. (d') 22A9-3-2, Cat. 742-2. (e') 22A17-3-4, Cat. 721-1. (f') 22A17-3-3, Cat. 717-1. (g') 22A17-3-4, Cat. 977-2. (h') 22A8-3-3, Cat. 659-5. (i') 22A8-3-3, Cat. 690-1. (j') 22A8-3-3, Cat. 687-6. (k') 22A23-3-1, Cat. 1342-10. (l') 22A8-3-3, Cat. 688-7. (m') 22A24-3-2, Cat. 1400-1. (n') 22A16-3-2, Cat. 745-1. (o') 22A9-3-2, Cat. 686-4.

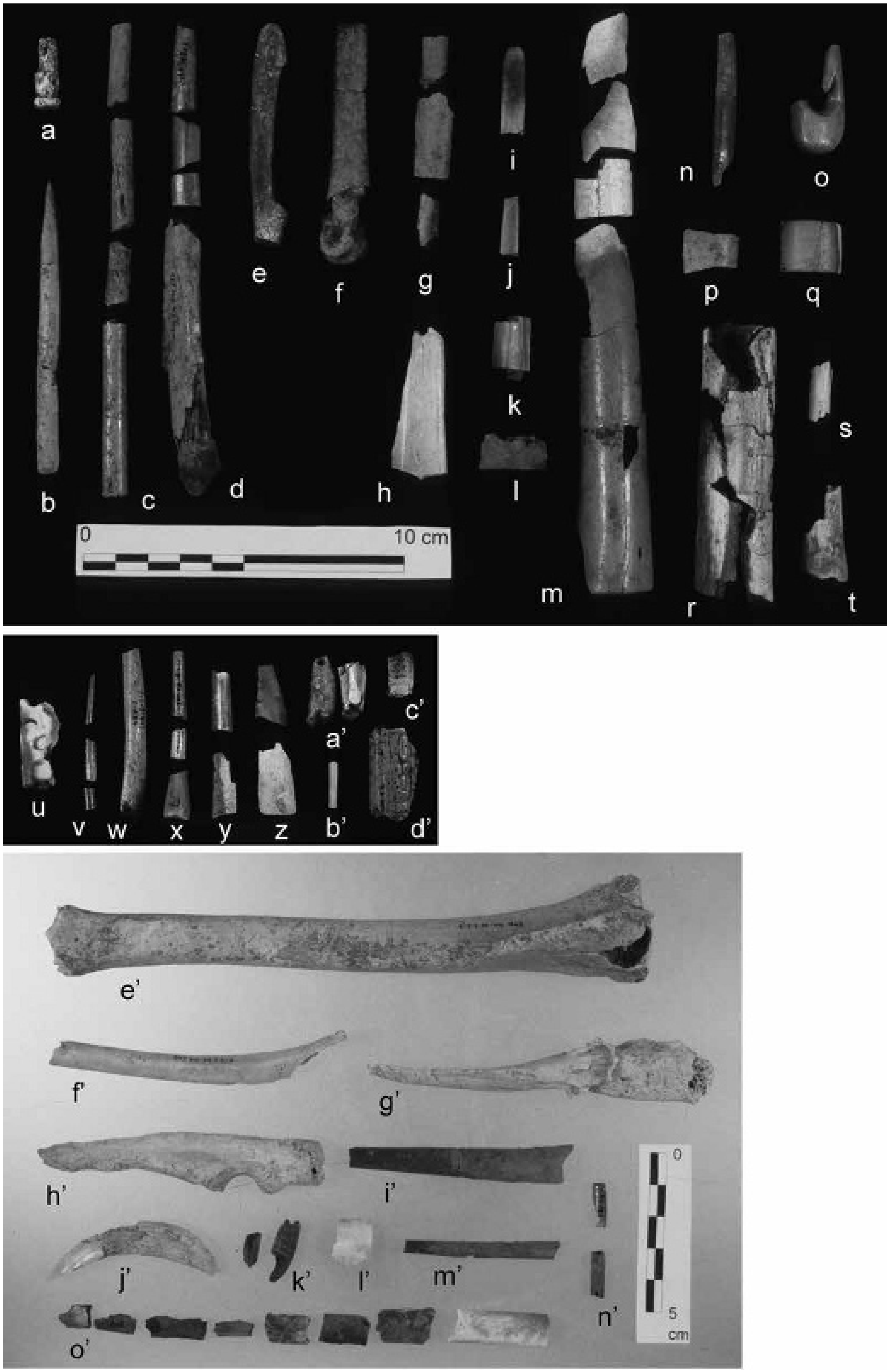


Figure 8.11. Bone artifacts from Structures M8-13, M8-2, M8-3, and M7-34. (a–t) Artifacts from Structure M8-13, excluding materials from middens and fill. (a) 14B10-3-1, Cat. 506-6. (b) 14B3-3-1, Cat. 484-1. (c) 14B10-3-1, Cat. 506-1. (d) 14B9-3-1, Cat. 473-1. (e) 14B2-3-6, Cat. 333-1. (f) 14B2-3-3, Cat. 322-6. (g) 14B10-3-1, Cat. 470-1. (h) 14B2-3-3, Cat. 268-1. (i) 14B2-2-2, Cat. 183-1. (j) 14B2-2-2, Cat. 183-2. (k) 14C4-3-3, Cat. 137-1. (l) 14B14-2-1, Cat. 973-9. (m) 14B30-3-2, Cat. 822-3. (n) 14B26-3-3, Cat. 953-2. (o) 14B26-3-3, Cat. 878-1. (p) 14B30-3-2, Cat. 822-4. (q) 14B26-3-3, Cat. 916-4. (r) 14B26-3-3, Cat. 916-2. (s) 14B26-3-3, Cat. 916-3. (t) 14B26-2-1, Cat. 667-5. (u–d') Artifacts from Structures M8-2 and M8-3. (u) 23B15-3-1, Cat. 291-1. (v) 23B4-3-4, Cat. 559-1. (w) 23B18-3-1, Cat. 634-1. (x) 23B18-3-1, Cat. 635-1. (y) 23B17-1-1, Cat. 168-1. (z) 23B5-3-1, Cat. 701-1. (a') 23B19-3-1, Cat. 691-1. (b') 23B18-1-1, Cat. 170-1. (c') 23B23-3-1, Cat. 386-1. (d') 23B23-1-2, Cat. 191-1. (e'–o') Artifacts from Structures M7-34, M7-91, and M7-92. (e') 21A39-3-3, Cat. 548-3. (f') 21A39-3-3, Cat. 547-2. (g') 21A39-3-4, Cat. 573-2. (h') 21A24-2-1, Cat. 482-1. (i') 21A39-3-4, Cat. 573-1. (j') 21A24-2-2, Cat. 489-1. (k') 21A42-2-2, Cat. 611-2. (l') 21A30-3-1, Cat. 745-1. (m') 21A30-3-3, Cat. 748-2. (n') 21A40-3-1, Cat. 587-19. (o') 21A42-2-2, Cat. 611-3.

manufacturing (Figure 8.9a). Cat. 22A806-69 is a long object with many incisions, but given the fact that it was placed in the royal storage room, it may have been a finished product (Figures 8.6f, 8.7b). Some apparently unworked long bones may have been kept for future tool or ornament production. Cat. 23A1474-2 (Figure 8.9b) is probably a jaguar humerus and may have been kept for its symbolic value.

SHELL ARTIFACTS

Shell artifacts were more numerous than those of bone. The largest proportion of worked shell remains by specimen count (see Chapter 9) are made from *Psoronaias/Nephronaias*, the pearly nacred river clam available in abundance in the waters near the site. However, these fragments represent a much smaller number of artifacts and original individuals of the clam because the nacre is prone to fragmentation and is impossible to refit. Although the river clam was a food source, it was clearly also used in the manufacture of artifacts, likely crafted on site, as indicated by the recovery of several fragments of debitage. Two *Pomacea* shells were also found with perforations, indicating their use as artifacts, although these are much more commonly found unmodified and are likely primarily food refuse. The *Pomacea* is also available locally, found in slow-moving waters and artificial reservoirs (see Chapter 9).

More numerous in terms of artifact count and individual shells are, by far, the marine shells, primarily the marine gastropods. Most of the marine shell remains recovered at the site were worked (2,721 worked; 143 clearly unworked, as opposed to fragments where working is not visible), and even those that were not worked were undoubtedly used as decoration or in ceremony. All 30 taxa of marine shell were likely used in the manufacture of artifacts (although no modified remains were found of 8 of these taxa). The most common, diverse, and ubiquitous taxa among the artifacts (including those modified, unmodified, and unclear) were the gastropods (2,533 artifacts, found in all but one structure). Most were large-bodied gastropods (1,093 artifacts), dominated by strombs (4 identified species, 1,060 artifacts). Intermediate and small gastropods included the ubiquitous olives (5 identified species, 414 artifacts, found in 10 of the 12 structures), marginellas (1 identified species, 757 artifacts, found in half the structures), and 8 other identified taxa that appeared in very small numbers and often in single contexts. The marine bivalves of the collection are less common (188 artifacts, found in 7 structures) and are dominated by *Spondylus* (130 artifacts, found in 5 structures), with an additional 5 taxa found in small numbers and isolated contexts.

Significantly, although the majority of these taxa were from the Caribbean and Mexican Gulf waters, at least two were definitely of Pacific origin: *O. porphyria* and the bivalve *P. mexicana*. The specimens of Trividae (tentatively identified as *Pusula pediculus*), *Jenneria pustulata*, and *Morum tuberculosum* have also been identified here as of Pacific origin by comparison with the malacological collections of the Florida Museum of Natural History Invertebrate Zoology division. But it should be cautioned that archaeological specimens are very difficult to identify accurately to species, and the genera range widely, including species in both the Caribbean and Mexican Gulf waters. *Spondylus* is also a wide-ranging genus, and once it is modified into artifacts, we cannot distinguish the species level by morphology alone. It is possible that some specimens of this taxon were also Pacific in origin (see Chapter 9).

Like the bone artifact analysis, the study of shell artifacts followed a classification system developed from that of the Aguateca Subproject of the Petexbatun Regional Archaeological Project (Inomata 2007a; Emery 1997, 2010). As in the case of bone artifacts, the classification of shell artifacts is based primarily on their morphology. We assume that many of the shell artifacts are ornamental, but the correlations between their forms and specific use are not clear-cut. Table 8.2 presents the frequency of objects by category and area.

Pendants or tinklers are marine Olividae, Marginellidae, and other intermediate and small gastropods (Figure 8.20a). Tinklers with one or two perforations were probably strung along one thread, and their possible use included necklaces (Figures 8.15a, c–e, b', g', h'; 8.16e–i, c', d'; 8.17d, f, h, m'–q', s'; 8.18m–r, t; 8.19m–o; 8.20b, g–j, p–s, v, w, i'–k', n', p'; 8.21a–c, g, k, n, o, w–a', c'–e'; 8.22a–c, f, h, k, s). Those with more perforations may have been tied together in multiple rows as bracelets, anklets, pectorals, and attachments to textiles or other ornaments (Figures 8.15d', e'; 8.16d, e; 8.17t'; 8.18s; 8.22j, m). Some of the tinklers have the spire (tip above the body whorl) cut off whereas others do not, and some have been smoothed flat at the back, back and front, or two sides. Similar artifacts are found at various Maya sites, including Altar de Sacrificios (Willey 1972:Figure 195) and Piedras Negras (Coe 1959:Figure 52s, t). Shells potentially making a single necklace or other ornament were counted as one; the frequencies of individual shells were noted in parentheses in Table 8.2.

Table 8.2. Distribution of Shell Artifact Types by Operation.

			Palace Group		Causeway Area					Barranca Escondida	Granada Group
Category	Subcategory	Total	22A	22B	23A	20A	14B,C,D	23B	21A	24A,B,C	25A
Pendant or tinkler	Univalve tinkler with one or two holes with the top cut off	66 (249)	13 (96)	5 (8)	18 (26)	15 (87)	5 (5)	7 (21)	3 (6)		
	Univalve tinkler with one or two holes without the top cut off	26 (846)	5 (727)	2 (8)	8 (10)	9 (87)			2 (14)		
	Univalve tinkler with multiple holes with the top cut off	1 (1)		1 (1)							
	Univalve tinkler with multiple holes without the top cut off	14 (41)	4 (7)		2 (4)	4 (26)	1 (1)		3 (3)		
	Pendant	2 (2)		1 (1)		1 (1)					
	Pendant or tinkler, not clear	28 (88)	1 (1)	1 (1)	15 (15)	5 (5)	1 (1)	1 (52)	4 (13)		
	Subtotal	137 (1227)	23 (831)	10 (19)	43 (55)	34 (206)	7 (7)	8 (73)	12 (36)		
Bead or ring	Bead	52 (1231)	13 (1010)	5 (31)	17 (80)	7 (69)	4 (16)	1 (1)	3 (20)	1 (3)	1 (1)
	Ring	22 (1144)	5 (1043)	7 (12)	8 (8)	2 (81)					
	Subtotal	74 (2375)	18 (2053)	12 (43)	25 (88)	9 (150)	4 (16)	1 (1)	3 (20)	1 (3)	1 (1)
Other ornament or toy	Ornament with holes	35 (42)	13 (15)	2 (2)	11 (15)	4 (5)		1 (1)	3 (3)	1 (1)	
	Circular disk without hole	12 (12)	1 (1)		8 (8)	1 (1)		1 (1)	1 (1)		
	Other ornament without hole	18 (33)	1 (1)	2 (10)	11 (17)	3 (3)		1 (2)			
	Ear plug	15 (15)	4 (4)	5 (5)	2 (2)	2 (2)	1 (1)		1 (1)		
	Possible spearthrower finger-loops	5 (6)			3 (4)	2 (2)					
	Ornament or toy, not clear	32 (32)	12 (12)	11 (11)	7 (7)	1 (1)		1 (1)			
	Subtotal	117 (140)	31 (33)	20 (28)	42 (53)	13 (14)	1 (1)	4 (5)	5 (5)	1 (1)	
Other type of artifact	Conch trumpet	1 (1)			1 (1)						
	Other type of worked large conch	1 (1)	1 (1)								
	Ink pot or other type of vessel	1 (1)			1 (1)						
	Unworked shell	29 (32)	3 (3)	1 (1)	18 (19)	1 (1)	1 (3)	1 (1)		4 (4)	
	Subtotal	32 (35)	4 (4)	1 (1)	20 (21)	1 (1)	1 (3)	1 (1)		4 (4)	
Undetermined	Undetermined	181 (190)	33 (39)	24 (24)	60 (61)	28 (28)	12 (12)	14 (16)	9 (9)	1 (1)	
Total		541 (3967)	109 (2960)	67 (115)	190 (278)	85 (399)	25 (39)	28 (96)	29 (70)	7 (9)	1 (1)

Note: Multiple pieces possibly forming an ornament such as a necklace are counted as one. Totals in parentheses indicate the total numbers of individual pieces. The table does not include pieces found in construction fill, food refuse, or debitage.

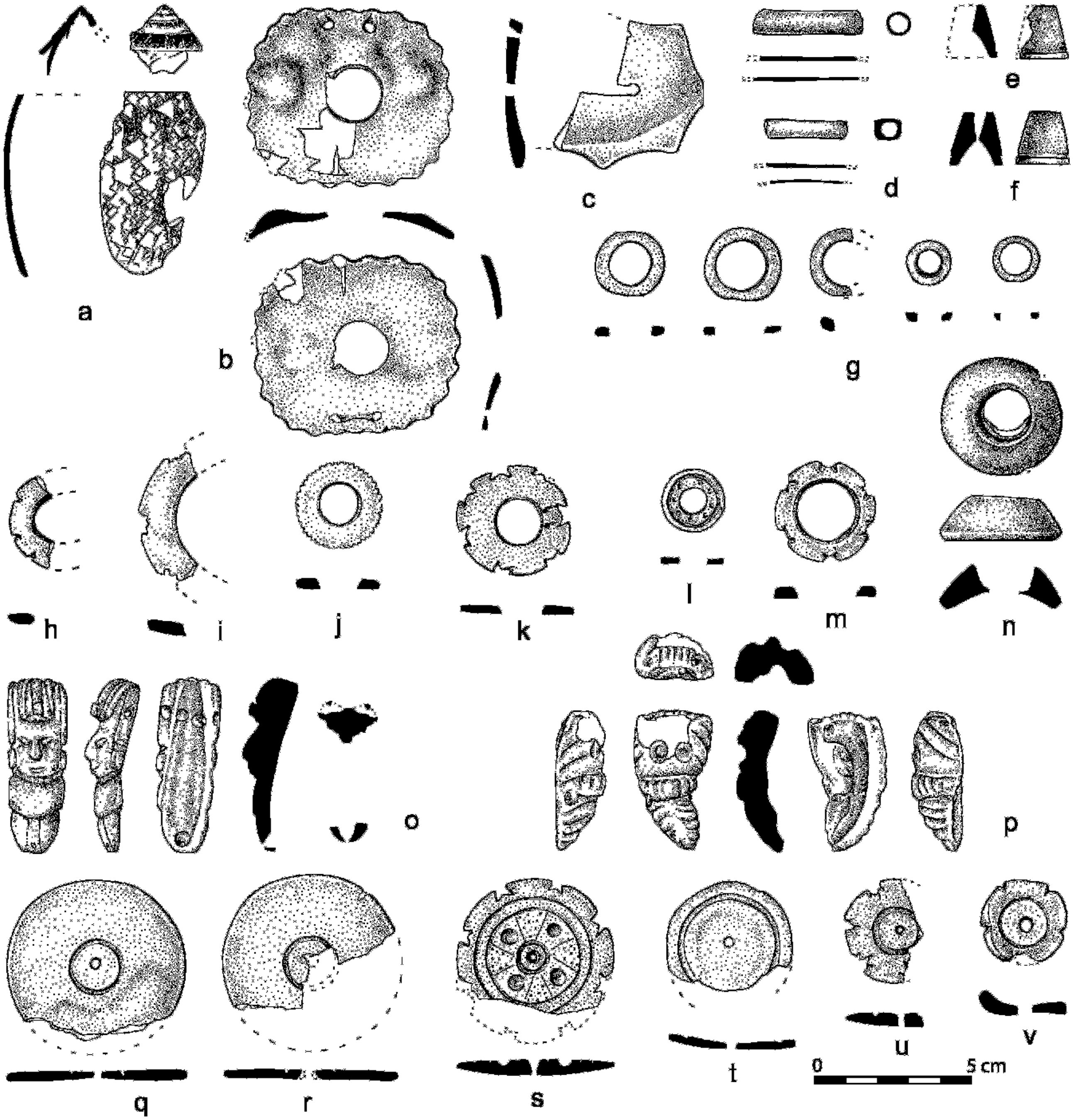


FIGURE 8.12. Shell tinklers, beads, rings, and ornaments with perforations. (a) Shell belt tinkler and its debitage. 22B3-3-2, Cat. 185-4 (top), 22B13-3-1, Cat. 494-1 (bottom). (b–c) Pendants. (b) 20A19-3-1, Cat. 959-5. (c) 22B35-3-4, Cat. 441-1. (d–f) Cylindrical and conical beads. (d) 20A19-3-1, Cat. 959-6. (e) 23A7-3-1, Cat. 726-1. (f) 23A29-3-1, Cat. 779-3. (g) Small rings. 22A45-3-1, Cat. 1039-70. (h–n) Medium to large rings. (h) 22A45-3-1, Cat. 1039-68. (i) 22B53-3-1, Cat. 653-14. (j) 22B39-3-2, Cat. 508-1. (k) 23A41-3-4, Cat. 942-1. (l) 23A22-3-2, Cat. 1471-1. (m) 20A19-3-1, Cat. 1020-3. (n) 23A22-3-1, Cat. 1478-1. (o–p) Other ornaments with elaborate carving and holes. (o) 22A-6-2-3, Cat. 565-22. (p) 20A45-3-2, Cat. 1584-3. (q–z) Circular disks with a perforation. (q) 23A41-3-3, Cat. 941-2. (r) 23A41-3-1, Cat. 936-3. (s) 23A17-3-4, Cat. 950-2. (t) 23A30-3-1, Cat. 1954-1. (u) 22A49-3-1, Cat. 1060-50. (v) 20A19-3-1, Cat. 1020-1.

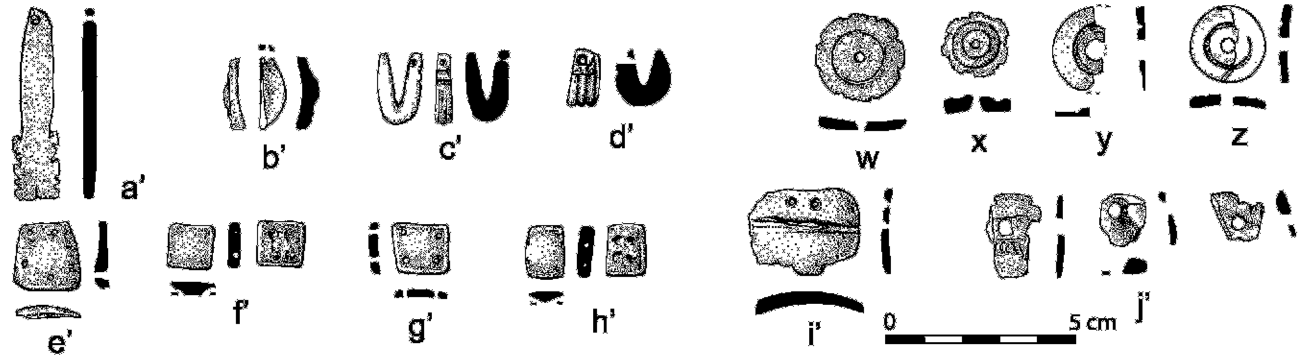


Figure 8.12. (cont'd.) (w) 21A65-3-1, Cat. 1377-4. (x) 23A42-3-2, Cat. 1996-46. (y) 22A45-3-1, Cat. 1039-56. (z) 23B19-3-2, Cat. 694-1. (a'–d') Ornaments with a perforation on one end. (a') 24A0-0-0, Cat. 161-2. (b') 22A6-3-3, Cat. 726-1. (c') 20A5-1-1, Cat. 121-1. (d') 23A17-3-4, Cat. 1532-2. (e'–h') Spondylus plaques with multiple perforations. (e') 22A6-3-1, Cat. 740-34. (f') 22A6-3-1, Cat. 740-33. (g') 22B3-3-1, Cat. 165-5. (h') 22B42-3-3, Cat. 429-1. (i'–j') Other ornaments with multiple perforations. (i') 23A41-3-2, Cat. 948-1. (j') 22A12-3-1, Cat. 855-1.

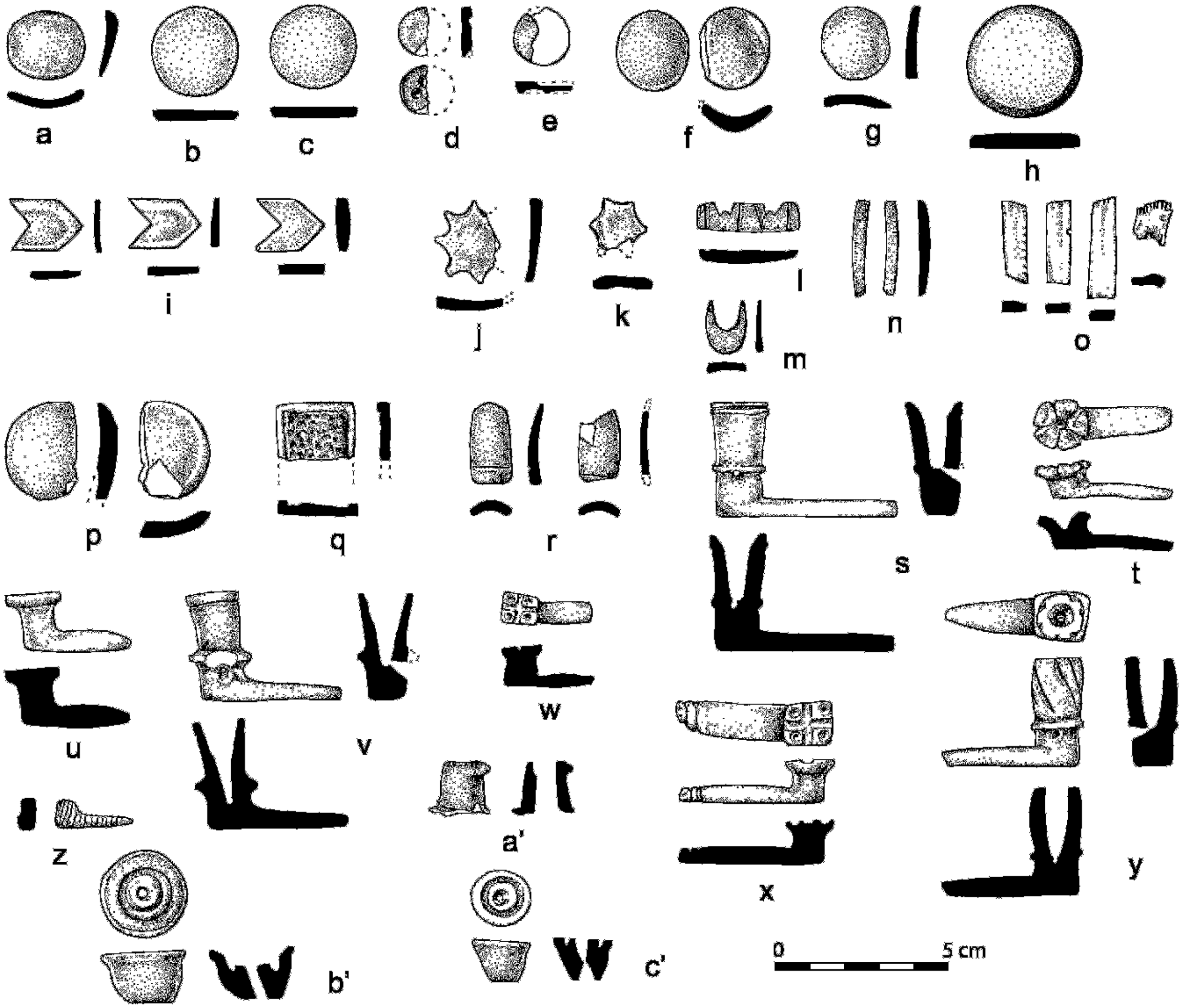


Figure 8.13. Shell artifacts without perforations and ear ornaments. (a–h) Circular disks. (a) 22A45-3-1, Cat. 1039-69. (b) 23A18-3-1, Cat. 1256-2. (c) 23A43-3-4, Cat. 1896-9. (d) 23A42-3-2, Cat. 2024-4. (e) 23A5-3-2, Cat. 819-92. (f) 20A5-3-3, Cat. 261-34. (g) 23B12-3-1, Cat. 680-1. (h) 21A2-3-1, Cat. 366-1. (i–r) Other ornaments without perforations. (i) 22B43-3-3, Cat. 531-30. (j) 22B42-3-3, Cat. 429-12. (k) 23A18-3-1, Cat. 2131-3. (l) 23A43-3-3, Cat. 1634-1. (m) 23A17-3-4, Cat. 1180-4. (n) 23A43-2-1, Cat. 1282-2. (o) 23A48-3-4, Cat. 1464-1. (p) 23A28-3-1, Cat. 760-2. (q) 20A18-3-4, Cat. 886-1. (r) 23B19-3-1, Cat. 487-187. (s–c') Possible ear ornaments. (s) 22A49-3-1, Cat. 1060-47. (t) 22A49-3-1, Cat. 1060-48. (u) 22A49-3-1, Cat. 1060-49. (v) 22B42-2-4, Cat. 386-2. (w) 22B3-3-1, Cat. 168-6. (x) 22B54-3-2, Cat. 644-11. (y) 20A19-3-1, Cat. 866-4. (z) 14B1-3-2, Cat. 295-1. (a') 23A21-3-2, Cat. 1612-1. (b') 22B39-3-2, Cat. 618-3. (c') 22B56-3-2, Cat. 622-1.

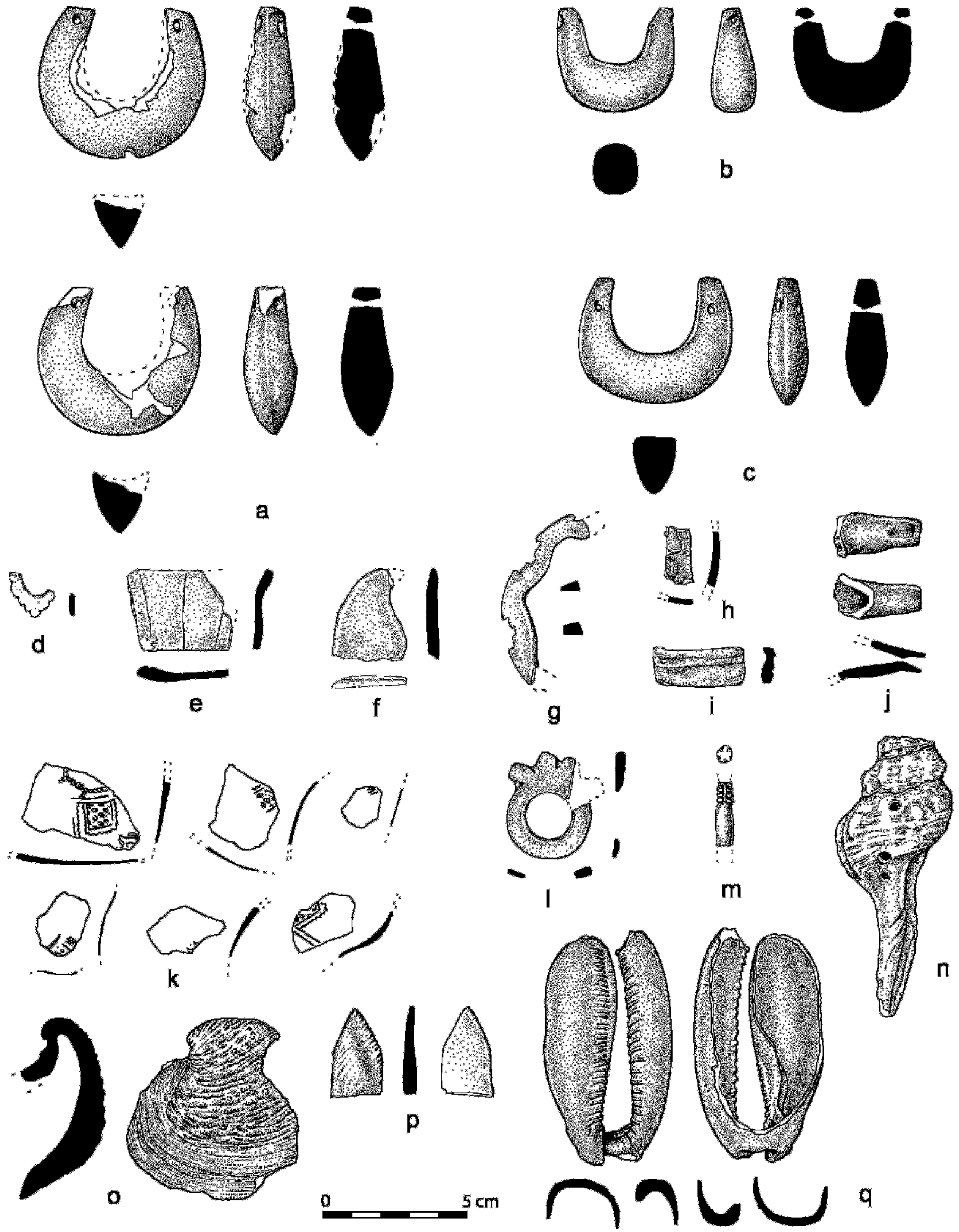


FIGURE 8.14. Possible spearthrower finger-loops, ornaments with unknown use, and debitage. (a–c) Possible spearthrower finger-loops. (a) 23A41-3-3, Cat. 1104-3. (b) 20A18-3-2, Cat. 887-2. (c) 20A12-1-1, Cat. 134-1. (d–m) Other ornaments with unknown use. (d) 22A49-3-1, Cat. 1060-136. (e) 22A49-3-1, Cat. 1060-51. (f) 22A44-3-1, Cat. 2131-237. (g) 22A3-2-2, Cat. 205-1. (h) 22A10-2-5, Cat. 405-4. (i) 22B13-3-1, Cat. 494-4. (j) 23A17-3-4, Cat. 1180-3. (k) 22B13-3-1, Cat. 494-6. (l) 23A42-3-4, Cat. 1844-1. (m) 20A19-3-4, Cat. 939-1. (n) Shell trumpet. 23A17-3-2, Cat. 946-1. (o) Unworked river clam. 23A15-3-2, Cat. 1456-1. (p–q) Debitage.

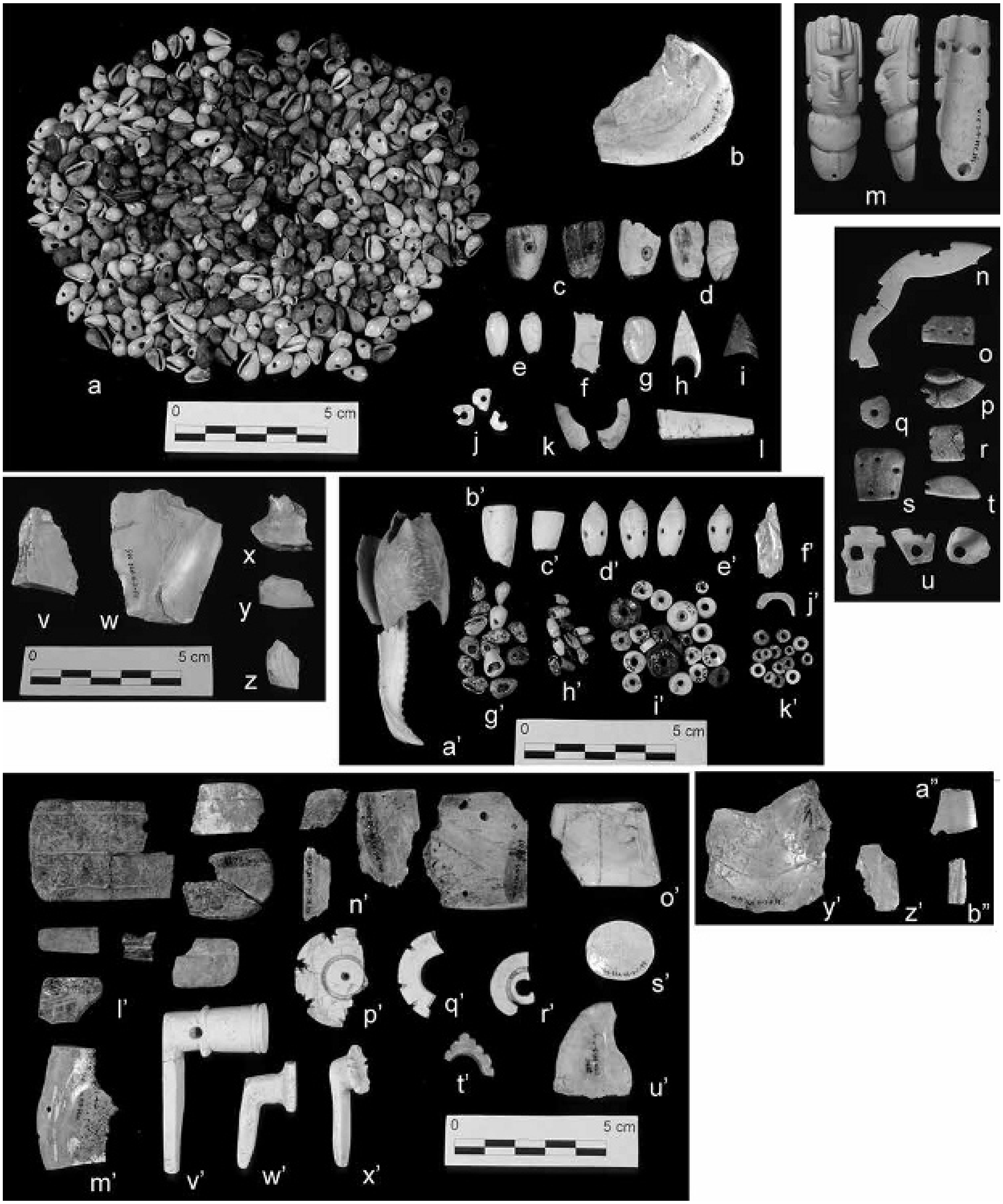


FIGURE 8.15. Shell artifacts from Structure M7-22. (a–l) Artifacts from the easternmost room and the area in front of it. (a) 22A10-2-8, Cat. 733-33. (b) 22A10-2-5, Cat. 402-1. (c) 22A10-2-6, Cat. 632-9. (d) 22A14-2-6, Cat. 650-2. (e) 22A14-2-5, Cat. 354-3. (f) 22A10-2-5, Cat. 405-4. (g) 22A22-3-1, Cat. 478-1. (h) 22A22-3-1, Cat. 478-2. (i) 22A10-2-6, Cat. 507-40. (j) 22A10-2-4, Cat. 260-1. (k) 22A10-2-8, Cat. 646-1. (l) 22A24-2-3, Cat. 2085-1. (m–k') Artifacts found in and around the east front room. (m) 22A6-2-3, Cat. 565-22. (n) 22A3-2-2, Cat. 205-1. (o) 22A9-1-1, Cat. 119-2. (p) 22A9-2-5, Cat. 2033-26. (q) 22A9-3-2, Cat. 699-1. (r) 22A6-3-1, Cat. 740-33. (s) 22A6-3-1, Cat. 740-34. (t) 22A6-3-3, Cat. 726-1. (u) 22A12-3-1, Cat. 855-1. (v–z) Possible debitage and indeterminate. (v) 22A9-2-3, Cat. 549-1. (w) 22A6-2-3, Cat. 566-1. (x) 22A9-3-3, Cat. 309-1. (y) 22A6-3-3, Cat. 728-1. (z) 22A9-2-5, Cat. 583-17. (a') 22A6-3-1, Cat. 744-13. (b') 22A6-3-1, Cat. 744-6. (c') 22A6-2-3, Cat. 568-10. (d') 22A12-3-1, Cat. 858-11. (e') 22A9-2-4, Cat. 559-2. (f') 22A28-2-1, Cat. 539-1. (g') 22A9-2-5, Cat. 583-1. (h') 22A6-2-4, Cat. 664-1. (i') 22A6-2-3, Cat. 568-12. (j') 22A6-2-3, Cat. 568-11. (k') 22A9-3-4, Cat. 317-12. (l'–a") Artifacts from the western part of the structure. (l') 22A44-3-1, Cat. 1020-225. (m') 22A45-3-1, Cat. 1039-1147. (n') 22A44-3-1, Cat. 1020-218. (o') 22A49-3-1, Cat. 1060-51. (p') 22A49-3-1, Cat. 1060-50. (q') 22A45-3-1, Cat. 1039-68. (r') 22A45-3-1, Cat. 1039-56. (s') 22A45-3-1, Cat. 1039-69. (t') 22A49-3-1, Cat. 1060-136. (u') 22A44-3-1, Cat. 2131-237. (v') 22A49-3-1, Cat. 1060-47. (w') 22A49-3-1, Cat. 1060-49. (x') 22A49-3-1, Cat. 1060-48. (y') Unworked shell or debitage. 22A45-3-1, Cat. 1039-34. (z'–b") Unknown ornaments or debitage. (z') 22A40-2-1, Cat. 951-1. (a") 22A49-3-1, Cat. 1060-1. (b") 22A45-2-1, Cat. 1006-158.

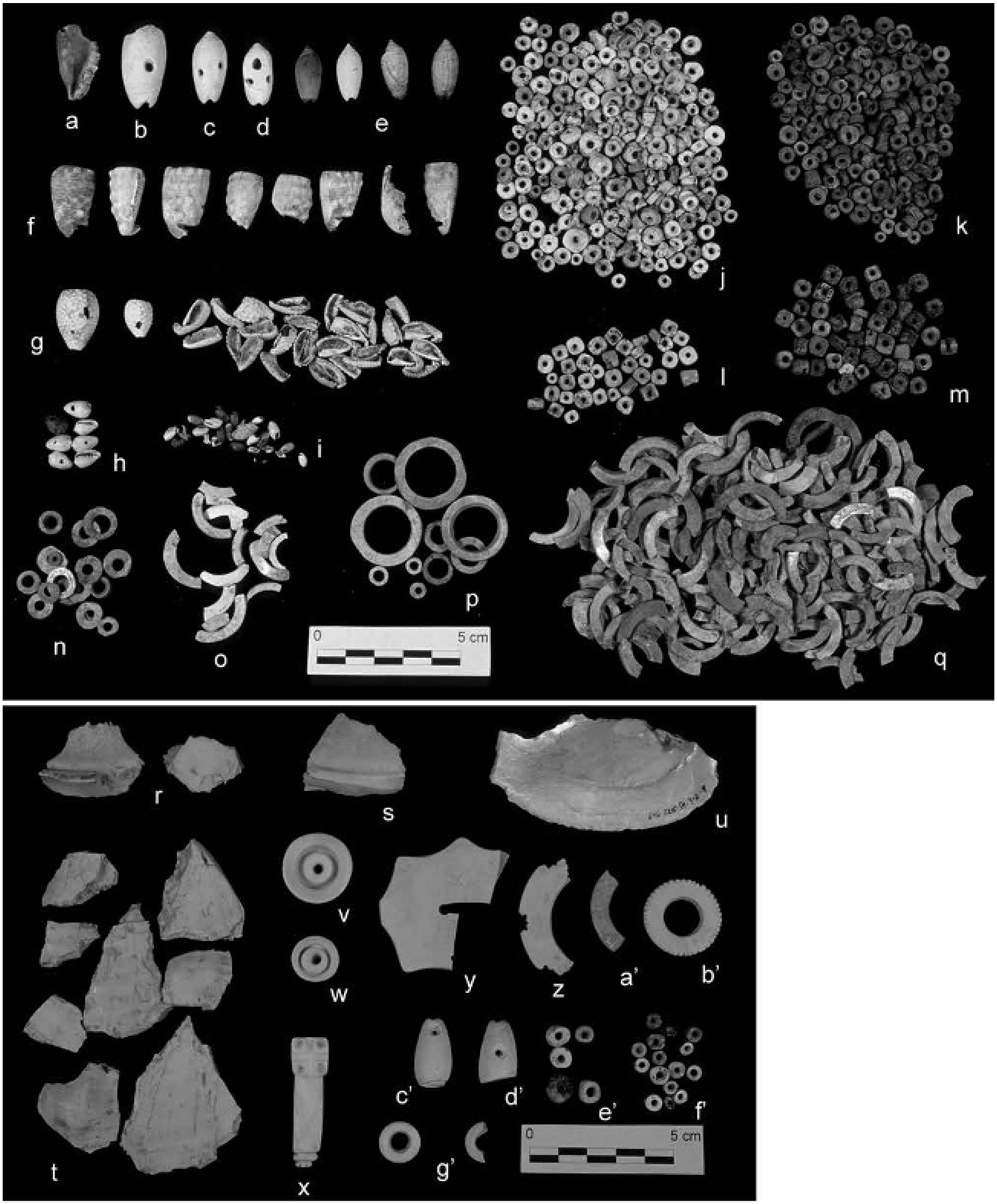


FIGURE 8.16. Shell tinklers, beads, and rings from the western part of Structure M7-22 (a–q) and artifacts from the northern part of Structure M7-32 (r–g'). (a) 22A45-3-1, Cat. 1039-1145.(b) 22A45-3-1, Cat. 1039-33. (c) 22A45-3-1, Cat. 1039-32. (d) 22A49-3-1, Cat. 1060-46. (e) 22A45-3-1, Cat. 1039-36. (f) 22A45-3-1, Cat. 1039-47. (g) 22A45-3-1, Cat. 1039-732. (h) 22A45-3-1, Cat. 1039-43. (i) 22A45-3-1, Cat. 1039-57. (j) 22A45-3-1, Cat. 1039-349. (k) 22A45-3-1, Cat. 1039-134. (l) 22A45-3-1, Cat. 1039-311. (m) 22A45-3-1, Cat. 1039-84. (n–q) 22A45-3-1, Cat. 1039-70. (r–s) Indeterminate. (r) 22B35-3-3, Cat. 474-1. (s) 22B55-3-2, Cat. 590-1. (t) Indeterminate or debitage. 22B55-3-2, Cat. 590-4. (u) Unworked river clam. 22B54-3-2, Cat. 646-8. (v–x) Possible ear ornaments. (v) 22B39-3-2, Cat. 618-3. (w) 22B56-3-2, Cat. 622-1. (x) 22B54-3-2, Cat. 644-11. (y) 22B35-3-4, Cat. 441-1. (z) 22B53-3-1, Cat. 653-14. (a') 22B39-3-2, Cat. 508-1. (b') 22B38-3-2, Cat. 616-9. (c') 22B53-3-1, Cat. 653-16. (d') 22B54-3-2, Cat. 646-7. (e') 22B35-3-2, Cat. 477-2. (f') 22B53-3-1, Cat. 653-2. (g') 22B53-3-3, Cat. 665-1.

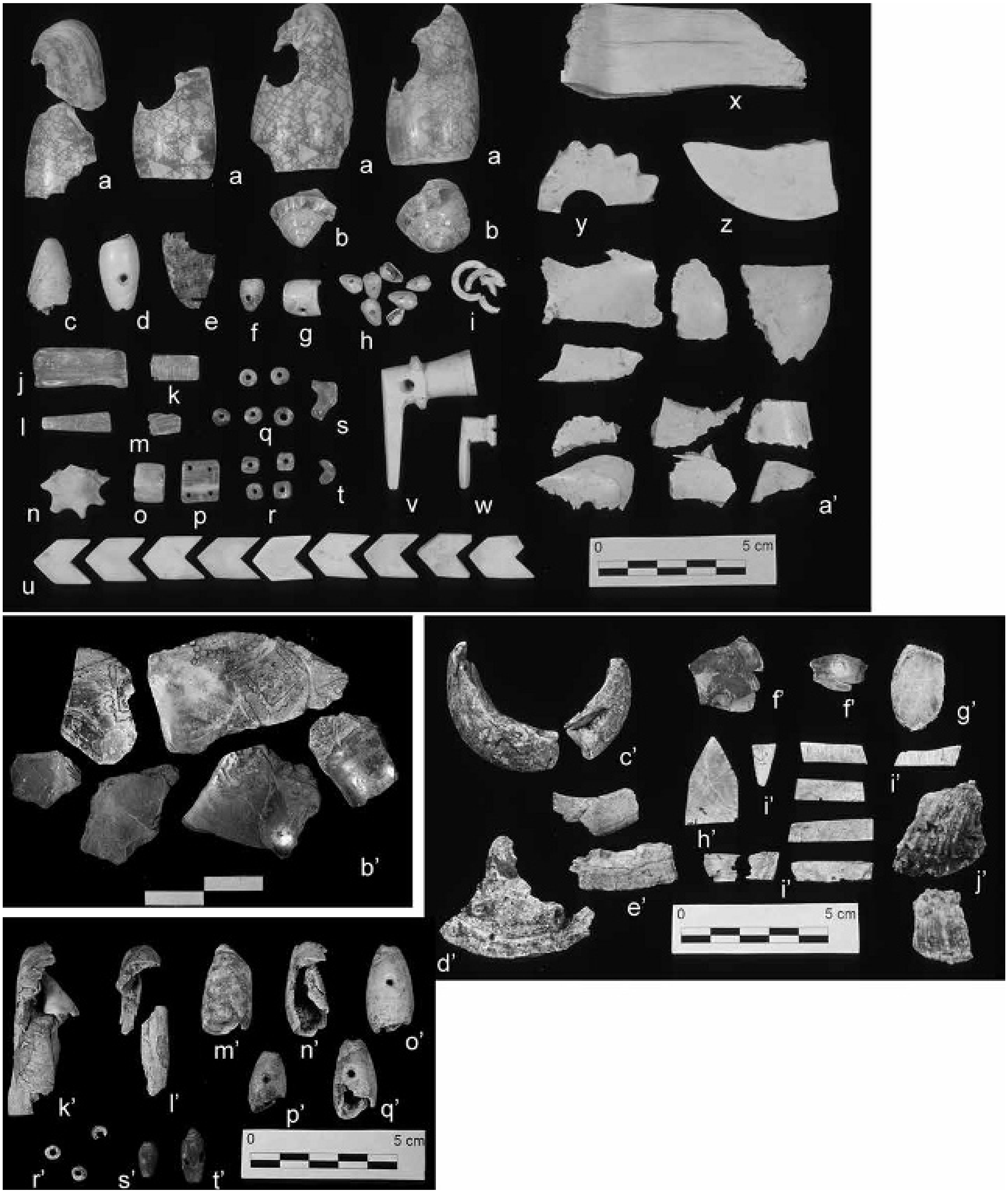


Figure 8.17. Shell artifacts from Structures M7-32 and M8-4. (a–b’) The central area of Structure M7-32. (a) 22B13-3-1, Cat. 494-1. (b) 22B3-3-2, Cat. 185-4. (c) 22B14-3-3, Cat. 607-1. (d) 22B12-3-4, Cat. 631-1. (e) 22B3-3-2, Cat. 185-3. (f) 22B43-3-3, Cat. 535-7. (g) 22B2-3-1, Cat. 198-1. (h) 22B2-3-3, Cat. 209-5. (i) 22B13-3-1, Cat. 494-5. (j–t) Artifacts made of Spondylus. (j) 22B13-3-1, Cat. 494-4. (k) 22B42-3-3, Cat. 429-15. (l) 22B42-3-3, Cat. 429-14. (m) 22B42-3-3, Cat. 429-13. (n) 22B42-3-3, Cat. 429-12. (o) 22B42-3-3, Cat. 429-16. (p) 22B3-3-1, Cat. 165-5. (q) 22B2-3-3, Cat. 208-1. (r) 22B43-3-3, Cat. 536-1. (s) 22B42-3-4, Cat. 521-1. (t) 22B2-2-5, Cat. 126-5. (u) 22B43-3-3, Cat. 531-30. (v) 22B42-2-4, Cat. 386-2. (w) 22B3-3-1, Cat. 168-6. (x) 22B42-2-4, Cat. 382-1. (y) 22B43-3-4, Cat. 544-2. (z) 22B3-3-1, Cat. 725-8. (a’) 22B43-3-3, Cat. 535-3. (b’) Elaborately carved shell. (1:1 scale) 22B13-3-1, Cat. 494-6. (c’–t’) The center room of Structure M8-4. (c’) 23A15-2-1, Cat. 1404-1. (d’–f’) Indeterminate or possible debitage. (d’) 23A14-3-2, Cat. 2003-3. (e’) 23A14-2-2, Cat. 1221-1. (f’) 23A46-3-1, Cat. 1988-8. (g’) Possible preform. 23A14-1-1, Cat. 149-2. (h’) 23A48-3-3, Cat. 2123-4. (i’) 23A48-3-4, Cat. 1464-1. (j’) Indeterminate or possible debitage (Spondylus). 23A48-3-3, Cat. 2040-2. (k’) 23A9-3-1, Cat. 1920-5. (l’) 23A13-2-1, Cat. 1145-2. (m’) 23A15-3-1, Cat. 1904-2. (n’) 23A47-3-2, Cat. 2022-3. (o’) 23A49-3-1, Cat. 1706-1. (p’) 23A48-2-1, Cat. 1392-7. (q’) 23A47-3-2, Cat. 2056-1. (r’) 23A48-3-4, Cat. 1461-16. (s’) 23A47-3-1, Cat. 2012-1. (t’) 23A47-3-2, Cat. 2056-2.

Many of the perforated univalve shells are 0.6 to 4 cm in length, but some measure up to 8 cm and may have been used as parts of belts (Figures 8.17k', 8.19v–b'). The 4 pieces of Cat. 22B494-1 are possible belt tinklers made of *Oliva porphyria* (Figures 8.12a, 8.17a). A belt made of 40 shells of this species was found in Burial 49 of Topoxte (Hermes 2000:140–142, Plate 5.3). Many depictions on stelae of the ceremonial belts worn by rulers show the multiple triangle patterns characteristic of this species (e.g., Aguateca Stela 7). In addition to tinklers made of marine shells, two freshwater apple snails (*Pomacea flagellata*) (Figures 8.17v, 8.19k) may have been used as tinklers, although their large sizes suggest their use as pendants or other ornaments. Similar perforated apple snails have been found at Piedras Negras (Coe 1959:Figure 52q).

Various shell ornaments with perforations may have served as pendants, but only one piece can be securely identified as such. This artifact, Cat. 20A959-5 (Figures 8.12b, 8.20h'), is a large ring with a scalloped outer edge and two perforations. A comparable large shell ring pendant includes one reported from Uaxactun (Kidder 1947:Figure 52). Shell ring pendants with scalloped or rounded edges are depicted in historical and mythical courtly scenes in ceramic paintings, in which they are often worn by probable scribes (e.g., K717, K1382, and K3009). The recent excavation of Structure A-16 at Ceibal, a possible royal residence, revealed a stucco facade that includes a figure wearing a scalloped-edged ring pendant (Ponciano et al. 2006:Figure 3.8). Some scalloped-edged pendants (with or without a central opening) from other sites have ancestral figures incised (Coe 1997:Figure 39; Finamore 2010:130). Another Aguateca shell piece (Cat. 22B441-1; Figures 8.12c, 8.16y) possibly served as a pendant. This object is broken in half but appears to have had two perforations for suspension and a horizontal slit. It also has scalloped edges, which probably represent symbolism comparable to that of Cat. 20A959-5. A similar pendant is reported from Altun Ha (Pendergast 1979:Figure 21a).

Heavily modified pieces in spherical, cylindrical, or flat circular shapes were classified as beads or rings. Many of the shell beads are circular disks generally measuring less than 0.3 cm in thickness and 1.3 to 2.5 cm in diameter (Figures 8.15i', k'; 8.16j–m, e', f'; 8.17q, r, r'; 8.18x, o'; 8.19r, s; 8.20c, l, n, t, o'; 8.21f, l, p, j'; 8.22i, o, p), but some are in cylindrical or conical forms (Figures 8.12d–f; 8.18w; 8.19p, e', f'; 8.20y). A large number of disk beads were found, particularly in the termination ritual deposits of Structure M7-22, and many of them were most likely strung together. Similar artifacts have been reported from various sites, including Altar de Sacrificios (Willey 1972:Figure 196) and Piedras Negras (Coe 1959:Figure 52e). Some of the conical shaped beads may have been part of ear ornaments or headdresses. Round objects with openings larger than 1 cm or larger than 50 percent of their exterior diameters are classified as rings, but the division between small rings and beads is arbitrary, as is the distinction between larger rings and round ornaments with holes. Small rings were found in large concentrations in the termination ritual deposits of Structure M7-22 (Figures 8.12g, 8.16n–q) and in smaller numbers in other structures (Figures 8.17i; 8.19m, q; 8.20q'). They may have been strung together with objects classified as beads. Larger rings, which include pieces with decorative carvings, may have been attached to headdresses, clothing, or ear ornaments or may have been used as pendants (Figures 8.12h–m; 8.15q'; 8.16z–b', g'; 8.17y; 8.18a'–c'; 8.19i; 8.20b'). Whereas most rings measure less than 0.3 cm in thickness, one piece has a thick, near-conical profile (Figures 8.12n, 8.19g).

The category of other ornaments or toys consists of a diversity of object types. Ornaments with perforations include pieces in a wide range of shapes, which may have been attached to clothing or headdresses or may have been used as ear ornaments or toys (Figure 8.15h, i, k, l'). Two pieces with elaborate carving, one representing a human figure and the other an unknown creature, may have been used as pendants (Figures 8.12o, p; 8.15m; 8.20o). Circular disks with a central perforation may have been used as ear ornaments. Although one would expect to find these artifacts in pairs, only one pair, Cat. 23A941-2 and 23A936-3 (Figures 8.12q, r; 8.18f', g'), was found. It is not clear whether other unpaired pieces (Figures 8.12s–z; 8.15p', r'; 8.18d', e', m'; 8.19f; 8.20z; 8.21g'; 8.22n) were attached to headdresses or clothing, or whether many pieces were lost in the fire and building collapse. Similar artifacts are reported from various sites, including Altun Ha (Pendergast 1990:Figure 4e–g; 1982:Figure 109) and Altar de Sacrificios (Willey 1972:Figure 197h). Another subcategory among ornaments or toys with holes includes pieces with a perforation on one end for suspension as pendants or attachment to headdresses or clothing (Figures 8.12a'–d', 8.15t, 8.18h', 8.22g). Some of them have hooked shapes with fine carvings (Figures 8.12c', d'; 8.18k'; 8.20d'). Pendergast (1990:344, Figure 149f–h) suggests that similar artifacts found at Altun Ha were clothing fasteners. Another subcategory consists of small orange *Spondylus* plaques with multiple perforations, which were most likely threaded

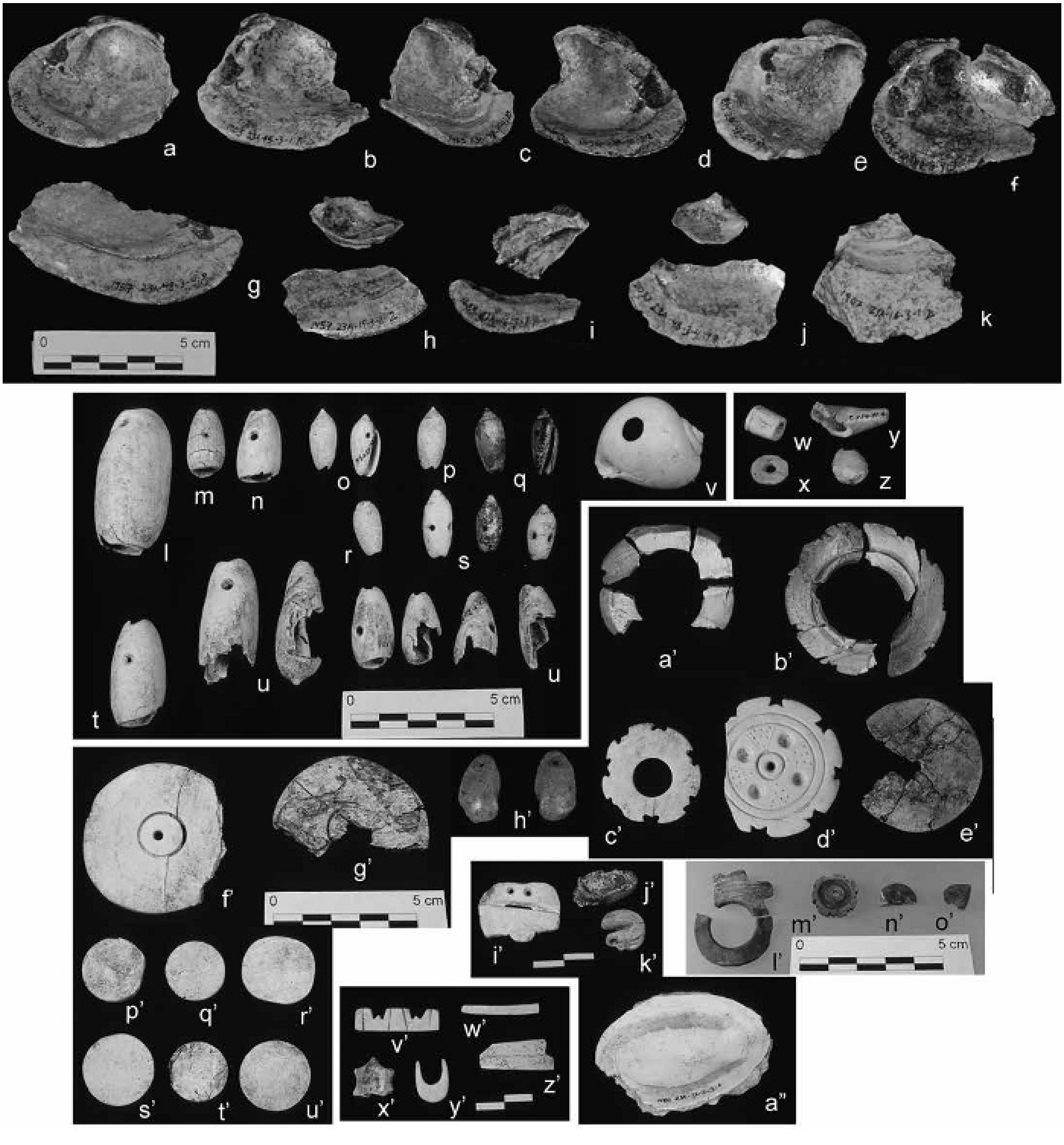


Figure 8.18. Shell artifacts from Structure M8-4. (a–k) Unworked river clams from the center room. (a) 23A48-2-1, Cat. 899-8. (b) 23A15-3-1, Cat. 1905-1. (c) 23A48-3-4, Cat. 1465-10. (d) 23A15-3-2, Cat. 1456-1. (e) 23A48-2-1, Cat. 895-9. (f) 23A48-3-4, Cat. 2034-3. (g) 23A48-3-4, Cat. 1467-8. (h) 23A15-3-2, Cat. 1457-2. (i) 23A16-3-1, Cat. 1685-1. (j) 23A48-3-4, Cat. 2033-19. (k) 23A16-3-1, Cat. 1907-2. (l–a") Artifacts from the north room. (l) 23A43-3-4, Cat. 1637-6. (m) 23A42-3-2, Cat. 1996-45. (n) 23A43-3-4, Cat. 1893-8. (o) 23A43-3-5, Cat. 1650-5. (p) 23A30-3-1, Cat. 1962-2. (q) 23A32-3-3, Cat. 1885-2. (r) 23A43-3-5, Cat. 1650-4. (s) 23A43-3-4, Cat. 1897-7. (t) 23A17-3-2, Cat. 947-2. (u) 23A18-2-2, Cat. 1050-2. (v) 23A42-3-2, Cat. 1826-44. (w) 23A32-3-3, Cat. 1885-4. (x) 23A44-3-1, Cat. 1532-1. (y) 23A17-3-4, Cat. 1180-3. (z) 23A43-3-5, Cat. 1891-1. (a') 23A41-3-1, Cat. 1132-8. (b') 23A41-3-1, Cat. 1138-1. (c') 23A41-3-4, Cat. 942-1. (d') 23A17-3-4, Cat. 950-2. (e') 23A18-3-2, Cat. 1107-248. (f') 23A41-3-3, Cat. 941-2. (g') 23A41-3-1, Cat. 936-3. (h') 23A42-3-2, Cat. 1997-40. (i') 23A41-3-2, Cat. 948-1. (j') 23A43-3-4, Cat. 1898-5. (k') 23A44-3-1, Cat. 1532-2. (l') 23A42-3-4, Cat. 1844-1. (m') 23A42-3-2, Cat. 1996-46. (n') 23A42-3-2, Cat. 2024-4. (o') 23A41-3-3, Cat. 1137-137. (p') 23A44-3-3, Cat. 1270-2. (q') 23A44-3-3, Cat. 1271-1. (r') 23A30-3-2, Cat. 2080-1. (s') 23A18-3-1, Cat. 1256-2. (t') 23A43-3-4, Cat. 1359-10. (u') 23A43-3-4, Cat. 1896-9. (v') 23A43-3-3, Cat. 1634-1. (w') 23A43-2-1, Cat. 1282-2. (x') 23A18-3-1, Cat. 2131-3. (y') 23A17-3-4, Cat. 1180-4. (z') 23A17-3-4, Cat. 1180-5. (a") 23A32-3-3, Cat. 1480-1.

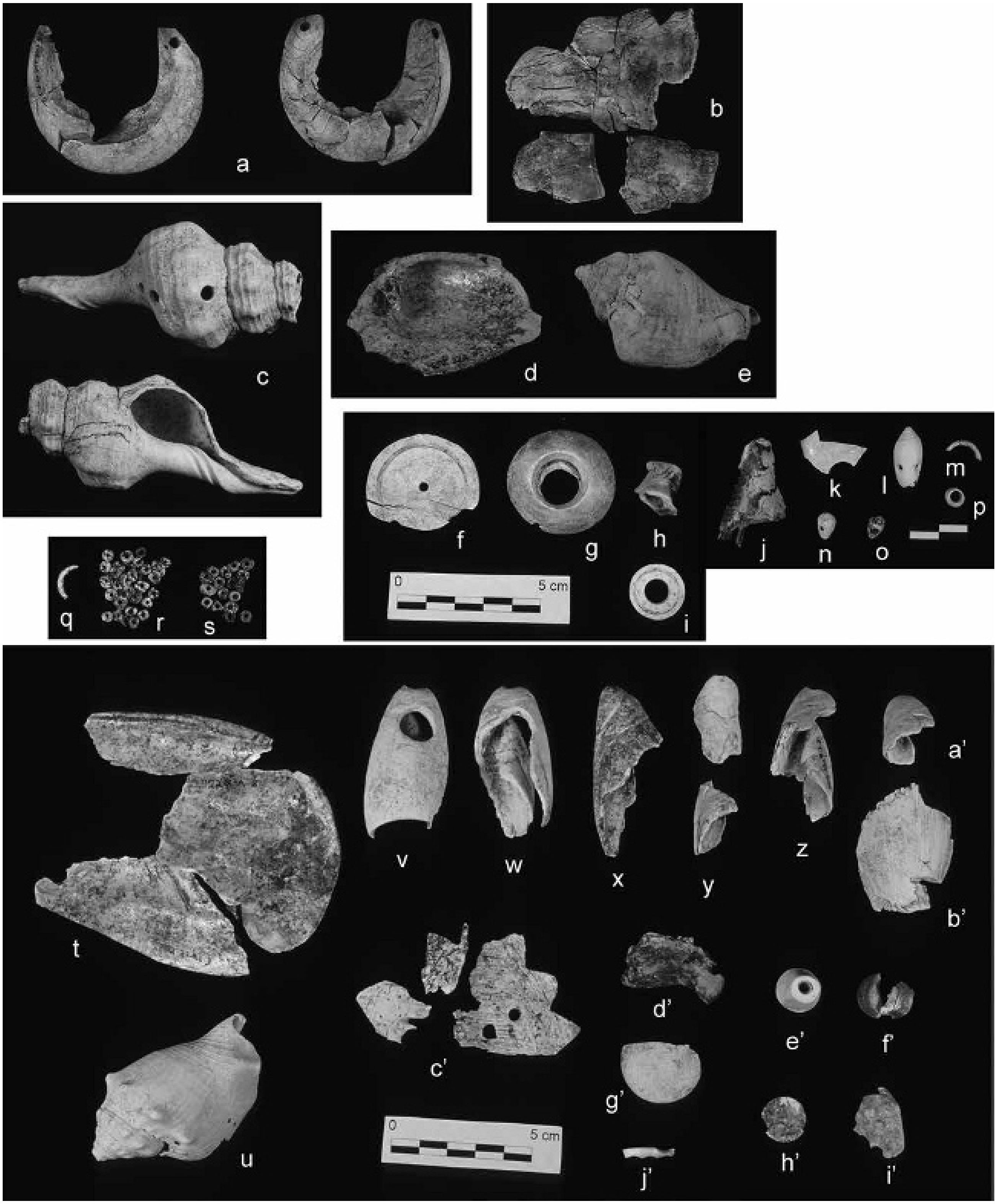


Figure 8.19. Shell artifacts from Structure M8-4. (a–e) Artifacts from the north room. (a) 23A41-3-3, Cat. 1104-3. (b) Ornament made of a large conch. 23A32-3-3, Cat. 1885-8. (c) 23A17-3-2, Cat. 946-1. (d–e) Unworked shells. (d) 23A43-3-5, Cat. 1652-9. (e) 23A30-3-4, Cat. 1492-1. (f–p) Artifacts from the north addition. (f) 23A30-3-1, Cat. 1954-1. (g) 23A22-3-1, Cat. 1478-1. (h) 23A21-3-2, Cat. 1612-1. (i) 23A22-3-2, Cat. 1471-1. (j) 23A30-3-2, Cat. 1733-24. (k) 23A30-3-2, Cat. 1733-22. (l) 23A30-3-2, Cat. 2087-2. (m) 23A22-3-1, Cat. 1477-2. (n) 23A21-3-2, Cat. 1530-4. (o) 23A21-3-2, Cat. 1529-2. (p) 23A30-3-2, Cat. 2083-3. (q–j') Artifacts from the south room. (q) 23A25-3-4, Cat. 2122-1. (r) 23A11-3-3, Cat. 703-1. (s) 23A28-3-3, Cat. 708-2. (t) 23A11-3-4, Cat. 772-3. (u) 23A7-3-3, Cat. 401-2. (v) 23A29-3-1, Cat. 565-1. (w) 23A28-3-1, Cat. 759-3. (x) 23A27-3-4, Cat. 734-1. (y) 23A8-1-1, Cat. 120-1. (z) 23A7-3-3, Cat. 400-1. (a') 23A7-3-2, Cat. 395-1. (b') 23A24-3-3, Cat. 677-1. (c') 23A7-3-4, Cat. 402-310. (d') Possible spearthrower finger-loop. 23A27-3-2, Cat. 751-5. (e') 23A29-3-1, Cat. 779-3. (f') 23A7-3-1, Cat. 726-1. (g') 23A28-3-1, Cat. 760-2. (h') 23A5-3-2, Cat. 819-92. (i') 23A4-2-1, Cat. 845-1. (j') 23A10-3-4, Cat. 750-3.

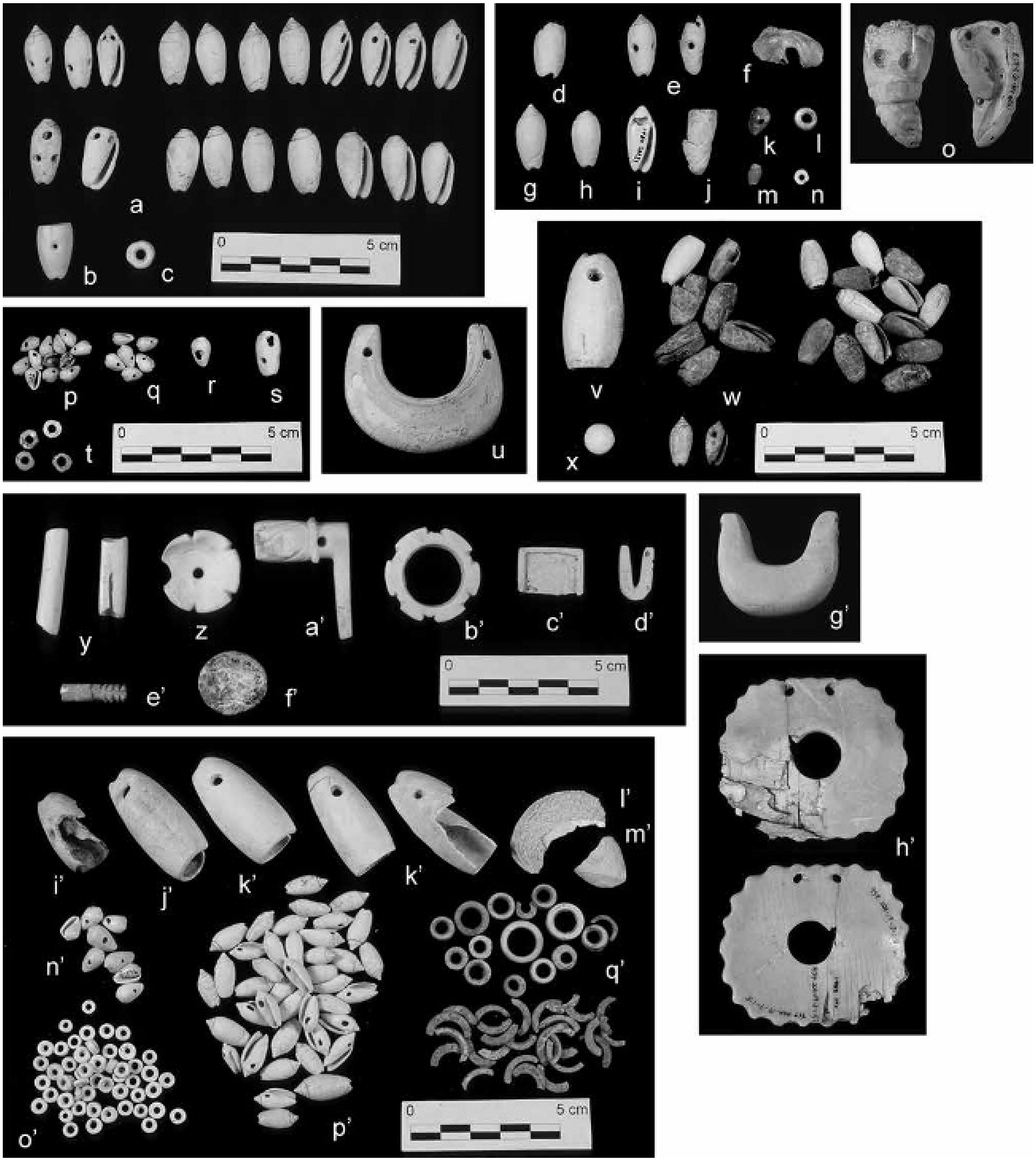


FIGURE 8.20. Shell artifacts from Structure M8-8. (a–c) Artifacts from the center room. (a) 20A23-3-2, Cat. 1106-1. (b) 20A4-2-1, Cat. 160-1. (c) 20A22-2-1, Cat. 1108-1. (d–f) Artifacts from the south room. (d) 20A38-3-3, Cat. 1334-1. (e) 20A27-3-1, Cat. 1368-1. (f) 20A37-3-1, Cat. 1294-1. (g–o) Artifacts from the south side. (g) 20A33-3-2, Cat. 1474-1. (h) 20A32-3-1, Cat. 1480-2. (i) 20A32-3-1, Cat. 1480-1. (j) 20A45-3-2, Cat. 1589-2. (k) 20A33-3-1, Cat. 1444-20. (l) 20A31-3-3, Cat. 1347-8. (m) 20A32-2-1, Cat. 1316-1. (n) 20A32-3-2, Cat. 1352-1. (o) 20A45-3-2, Cat. 1584-3. (p–t) Artifacts from the south addition. (p) 20A31-3-2, Cat. 1677-1. (q) 20A31-3-2, Cat. 1353-1. (r) 20A31-3-4, Cat. 1608-1. (s) 20A31-3-4, Cat. 1609-2. (t) 20A35-3-1, Cat. 1603-1. (u–x) Artifacts from the north addition. (u) Possible spearthrower finger-loop. 20A12-1-1, Cat. 134-1. (v) 20A13-3-3, Cat. 596-1. (w) 20A13-3-1, Cat. 592-1. (x) 20A13-3-1, Cat. 595-26. (y–q') Artifacts from the north room. (y) 20A19-3-1, Cat. 959-7. (z) 20A19-3-2, Cat. 959-2. (a') Possible ear ornament. 20A18-3-4, Cat. 886-4. (b') 20A19-3-1, Cat. 1020-3. (c') 20A18-3-4, Cat. 886-1. (d') 20A5-1-1, Cat. 121-1. (e') 20A19-3-4, Cat. 939-1. (f') 20A5-3-3, Cat. 261-34. (g') Possible spearthrower finger-loop. 20A18-3-2, Cat. 887-2. (h') Pendant. 20A19-3-1, Cat. 959-5. (i') 20A5-3-1, Cat. 279-4. (j') 20A3-3-2, Cat. 377-1. (k') 20A19-3-5, Cat. 1029-13. (l') 20A19-2-2, Cat. 663-1. (m') 20A3-3-4, Cat. 508-2. (n') 20A19-3-5, Cat. 1017-59. (o') 20A3-3-3, Cat. 197-1. (p') 20A2-3-1, Cat. 385-5. (q') 20A6-3-1, Cat. 361-6.

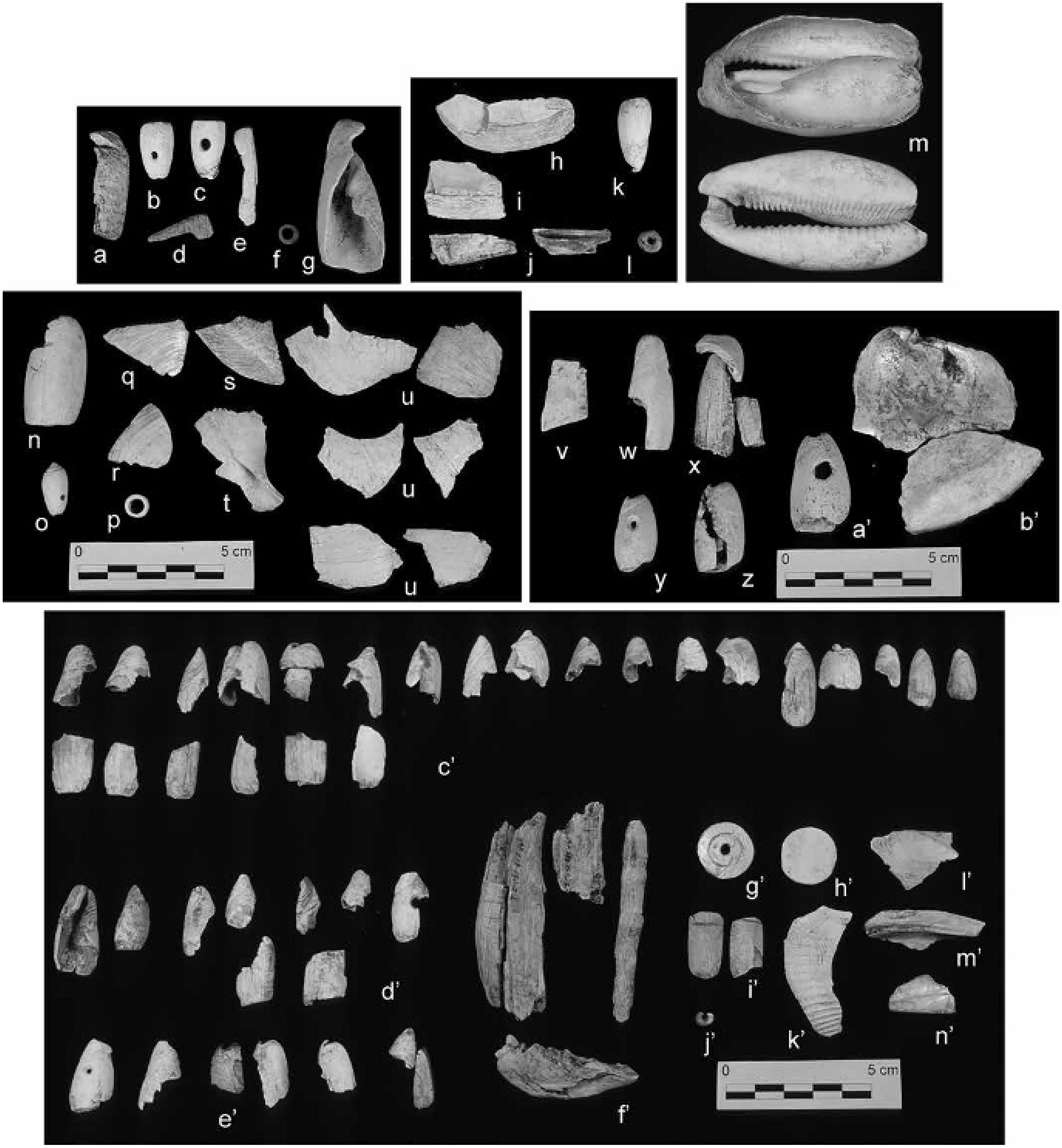


FIGURE 8.21. Shell artifacts from Structures M8-13, M8-2, and M8-3. (a–e) Artifacts from the west room of Structure M8-13. (a) 14B1-3-3, Cat. 298-1. (b) 14B1-1-2, Cat. 359-1. (c) 14B1-3-3, Cat. 296-2. (d) 14B1-3-2, Cat. 295-1. (e) 14B14-2-2, Cat. 412-1. (f–g) Artifacts from the center room of Structure M8-13. (f) 14B24-3-2, Cat. 896-1. (g) 14C5-3-2, Cat. 185-1. (h–m) Artifacts from the area behind Structure M8-13. (h–j) Debitage. (h) 14B26-2-1, Cat. 773-1. (i) 14B22-3-4, Cat. 933-1. (j) 14B30-3-3, Cat. 796-1. (k) 14B22-2-1, Cat. 741-1. (l) 14B22-3-4, Cat. 925-2. (m) Debitage. 14B22-3-3, Cat. 914-1. (n–u) Artifacts from the midden next to Structures M8-13 and M8-10. (n) 14B13-1-3, Cat. 155-2. (o) 14B13-1-3, Cat. 155-1. (p) 14B13-1-3, Cat. 155-3. (q–r) Debitage. (q) 14B13-1-3, Cat. 155-18. (r) 14B13-1-3, Cat. 155-19. (s) 14B13-1-3, Cat. 155-17. (t) 14B13-1-3, Cat. 155-15. (u) 14B13-1-3, Cat. 155-7. (v) Indeterminate shell artifact from Structure M8-2. 23B23-2-1, Cat. 769-1. (w–b’) Artifacts from Structure M8-3. (w) 23B15-3-2, Cat. 524-1. (x) 23B16-1-1, Cat. 154-1. (y) 23B15-3-2, Cat. 525-2. (z) 23B15-3-2, Cat. 526-3. (a’) 23B20-3-2, Cat. 501-2. (b’) Unworked river clam. 23B20-3-2, Cat. 249-3. (c’–n’) Artifacts from the area behind Structure M8-2. (c’) 23B19-3-1, Cat. 487-24. (d’) 23B19-3-1, Cat. 690-2. (e’) 23B12-3-2, Cat. 575-5. (f’) 23B25-1-2, Cat. 197-1. (g’) 23B19-3-2, Cat. 694-1. (h’) 23B12-3-1, Cat. 680-1. (i’) 23B19-3-1, Cat. 487-187. (j’) 23B19-3-1, Cat. 487-190. (k’) 23B13-3-4, Cat. 674-4. (l’) 23B19-3-1, Cat. 690-1. (m’) 23B25-3-2, Cat. 515-1. (n’) 23B12-3-2, Cat. 575-4.

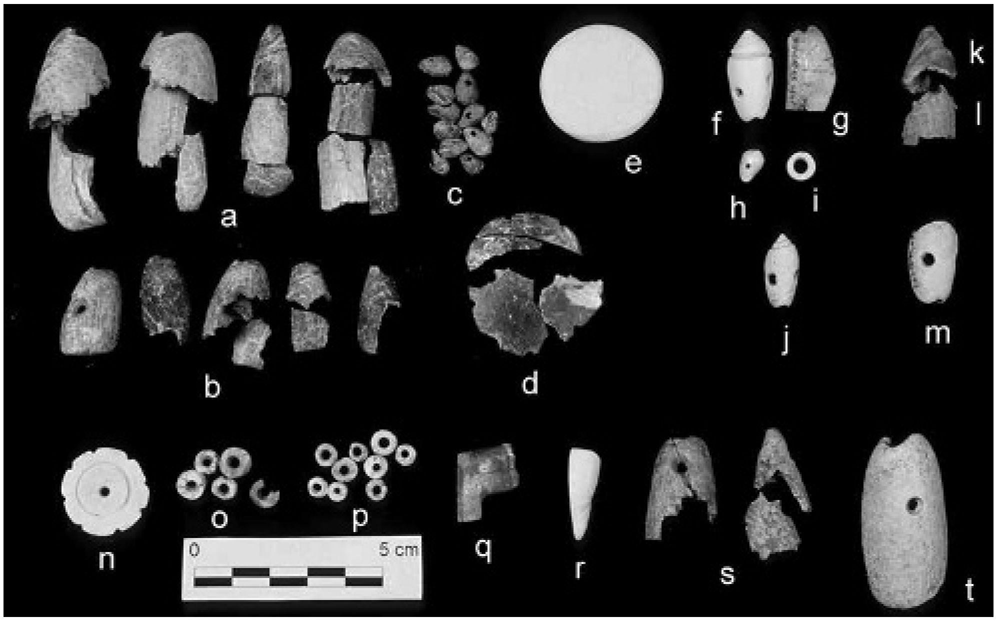


FIGURE 8.22. Shell artifacts from Structure M7-34 (a–m) and artifacts from Structures M7-91 and M7-92 and the Causeway (n–t). (a–d) Artifacts from the northern side. (a) 21A40-3-3, Cat. 578-6. (b) 21A40-2-1, Cat. 473-1. (c) 21A40-3-3, Cat. 578-1. (d) 21A40-3-3, Cat. 578-3. (e) Disk without hole from the north room. 21A2-3-1, Cat. 366-1. (f–j) Artifacts from the center room and the area in front of it. (f) 21A25-2-1, Cat. 460-1. (g) 21A25-2-1, Cat. 1474-8. (h) 21A25-2-2, Cat. 466-4. (i) 21A25-22, Cat. 461-2. (j) 21A51-1-2, Cat. 863-1. (k–m) Artifacts from the south room and the area in front of it. (k) 21A30-3-4, Cat. 812-1. (l) 21A30-2-3, Cat. 526-1. (m) 21A42-2-2, Cat. 610-1. (n) 21A65-3-1, Cat. 1377-4. (o) 21A72-3-2, Cat. 1086-1. (p) 21A72-3-3, Cat. 1256-1. (q) 21A78-1-1, Cat. 965-1. (r) 21A57-3-4, Cat. 1272-1. (s) 21A80-3-4, Cat. 1046-2. (t) 21A82-3-4, Cat. 1028-1.

together to form parts of headdresses or other ornaments (Figures 8.12e'–h'; 8.15r, s; 8.17o, p). A similar example from Piedras Negras Burial 5 is well known (Coe 1959:Figures 53, 54; Finamore 2010:112–113). Other pieces include larger ornaments with multiple perforations (Figures 8.12i', 8.18i', 8.19c') and elaborately shaped small pieces (Figures 8.12j', 8.15u).

Ornaments without perforations include circular disks and other forms. Many of them probably served as inlays or toys. Circular disks without holes are white and small, measuring 1.4 to 3.3 cm in diameter (Figures 8.13a–h; 8.15s'; 8.18p'–u'; 8.20f'; 8.21h'; 8.22e). One example, however, has unfinished perforations (Figures 8.13d, 8.18n'). Other ornaments without perforations include a diversity of object forms (Figures 8.13i–r; 8.15o, m', n'; 8.18v'–a''; 8.19j'; 8.20x). The 9 pieces of Cat. 22B531-30 are chevron-shaped shell, possibly inlay, which could have decorated the edges of a headdress, shield, or other object (Figures 8.13i, 8.17u). Cat. 22B429-12 and 23A2131-3 are star-shaped plaques (Figures 8.13j, k; 8.17n). Whereas many of those pieces are white in color, others are made of orange *Spondylus* shell: Cat. 23A1464-1, 9 pieces of narrow plaques (Figure 8.13o); Cat. 23A1885-7; and Cat. 22B429-12 (Figures 8.13j, 8.17n). Cat. 20A886-1 is a rectangular fragment with a lower surface created by a series of drillings and left unsmoothed (Figures 8.13q, 8.20c'). A similar, complete object was found in the midden next to Structure M8-10 during the Petexbatun Project (Inomata 1995:Figure 8.35d). Two small plaques with one end rounded and the other end squared (Cat. 23B487-187, Figure 8.21i') are similar to the possible ornament pieces made of bone that were found in the south room of Structure M8-4 (Cat. 23A652-73 and 23A553-1; Figures 8.4f, g; 8.8s, t).

Possible ear ornaments include objects often called ear plugs (Figures 8.13s–z; 8.15l, v'–x'; 8.16x; 8.17v, w; 8.18j'; 8.19h; 8.20a'; 8.22q). Although we expected to find them in pairs, that was not the case. Comparable objects are reported from various sites, including Altar de Sacrificios (Willey 1972:Figure 197a, b) and Uaxactun (Kidder 1947:Figure 56). A small object of a similar shape may have been an ear plug for a child (Cat. 14B295-1; Figures 8.13z, 8.21d), and conical, button-shaped pieces may have been parts of ear ornaments (Cat. 22B618-3 and 22B622-1; Figures 8.13b', c'; 8.16v, w). A unique artifact type includes U-shaped pieces with a perforation at each end. Ekholm (1962) identifies similar shell artifacts from Mexico as spearthrower finger-loops. His argument appears convincing, particularly with reference to the two preserved atlatls stored in the British Museum (see also Evans 2010:214). Nonetheless, at Aguateca only two pieces from the north room of Structure M8-4 (Cat. 23A1104-3; Figures 8.14a, 8.19a) make a clear pair as expected for use on a spearthrower. The other four pieces were found separately in the center room (Cat. 23A1404-1, Figure 8.17c') and the south room (Cat. 23A751-5, Figure 8.19d') of Structure M8-4, and the north room (Cat. 20A887-2; Figures 8.14b, 8.20g') and the north addition (Cat. 20A134-1; Figures 8.14c, 8.20u) of Structure M8-8. This last piece may have collapsed from the north room, as it was found in the humus layer. One possibility is that paired spearthrower finger-loops were disturbed at the time of abandonment. Another possibility is that these unpaired pieces served other functions. A similar object found at Altar de Sacrificios and reported as a bone object (Willey 1972:Figure 203a) may be made of shell.

Other possible ornaments and small fragments are included in the category of other ornaments with unknown use (Figures 8.14d–m; 8.15f, o', t', u'; 8.17j–m, s, t; 8.18y, l'; 8.19b; 8.20e'). Cat. 22B544-1 is a small fragment of a river clam with fine incised lines filled with red pigment showing a glyph (see Chapter 13, Figure 13.8). Cat. 22B494-6 consists of multiple small fragments of a river clam which appear to have formed a single object (Figures 8.14l, 8.17b'). It is also incised with fine lines filled with red pigment, which seem to represent a female in elaborate attire. It is not clear whether Cat. 22B544-1 and 22B494-6 were parts of the same object.

Other types of shell artifacts include a possible trumpet, an elaborately carved conch, a possible ink pot, and a perforated piece of brain coral. The possible trumpet is made of a horse conch (*Pleuroploca gigantea*) and has three perforations in a row (Cat. 23A946-1; Figures 8.14n, 8.19c). Measuring 9.6 cm in length, it is substantially smaller than the one found in Structure M7-35 during the Petexbatun Project (Inomata 1995). Comparable objects include those from Altun Ha (Pendergast 1990:Figures 96c, 102a, 149k; 1982:Figure 122). Some unprovenanced shell trumpets are inscribed with ancestral figures, indicating the symbolic value of these objects (Coe and Kerr 1997:41; Finamore et al. 2010:124–127). The elaborately worked helmet shell (*Cassis madagascariensis*) found in the easternmost room of Structure M7-22 is carved with glyphs (Cat 22A647-10). It is badly fragmented, but its edges are cut and smoothed. Its text is discussed in detail in Chapter 13 (see Figure 13.7).

At least 14 unworked river clam valves (*Psoronaias/Nephronaias* sp.) were found in the center room of Structure M8-4 (Figures 8.14o, 8.18a–k). Unworked river clams were also found in the center room of Structure M8-10 during the Petexbatun Project along with scribal implements (Inomata 1995), and their close association with stone palettes, probably used for pigment preparation, suggests their use as ink pots. However, we did not find pigment residues in these items, and we cannot discard the possibility that they were kept as raw material for ornament production. Unworked marine conches are rare, but Cat. 23A401-2 (Figure 8.19u) is a complete *Strombus pugilis* shell. Multiple possible debitage or preforms were found in association with Structures M7-22 (Figure 8.15v, w, y), M7-32, M8-4, M8-13, and M7-91. Three pieces of spires of Pacific olive shells (*Oliva porphyria*) (Cat. 22B185-4, Figure 8.12a) were found near 4 pieces of belt tinkers made of the same shell with the spire cut off (Cat. 22B494-1; Figures 8.12a, 8.17b). An irregular-shaped cut piece of *Spondylus* (Cat. 23A2123-4; Figures 8.14p, 8.17h') was found in the center room of Structure M8-4 along with 7 pieces of narrow plaques also of *Spondylus* (Cat. 23A1464-1; Figures 8.13o, 8.17i'). It is not clear if Cat. 23A2123-1 was debitage resulting from the production of Cat. 23A1464-1 or if both were finished products used together.

In the same room, excavators recovered fragments of *Spondylus* (Figure 8.17j'), large conches (Figure 8.17f'), and other shells (Figure 8.17d', e'), which may have been debitage. An oval piece with rough edges found in the same area is most likely a preform (Figure 8.17g'). At least 7 pieces of debitage were found in the back of Structure M8-13 and in the midden next to Structures M8-10 and M8-13 (Figure 8.21h–j, s, t, q, r), in addition to other pieces found in the same midden during the Petexbatun Project. A notable object is the bottom portion of a large cowrie shell (*Cypraea zebra*) (Cat. 14B914-1; Figures 8.14q, 8.21m). It appears that an artisan cut off the upper part to use as an ornament. Alternatively, this piece may have been used as an ornament. A unique object is a piece of brain coral with a perforation (Cat. 23A1843-533, Figure 8.8m'). Remains of coral are not common at Maya sites away from the sea, but they have been reported from Uaxactun (Kidder 1947:66), Caracol, Piedras Negras (Coe 1959:60, Figure 52d), Mayapan (Shook 1954:98), and Hatzcap Ceel (Thompson 1931:273).

Table 8.3. Condition of Bone Artifacts.

			Palace Group		Causeway Area					Barranca Escondida	Granada Group
Condition		**Total**	**22A**	**22B**	**23A**	**20A**	**14B&C**	**23B**	**21A**	**24A**	**26A&B**
Not burned	Complete or almost complete	17	2	4	3	1	1		5	1	
	Fragment	13	1	5	1	3	1		2		
	Subtotal	30	3	9	4	4	2	0	7	1	0
Slightly burned	Complete or almost complete	14	6		4	2	2				
	Fragment	55	8	3	10	14	7	6	3		4
	Subtotal	69	14	3	14	16	9	6	3	0	4
Heavily burned	Complete or almost complete	23	3	2	8	10					
	Fragment	94	8	2	34	26	11	6	7		
	Subtotal	117	11	4	42	36	11	6	7	0	0
Total		216	28	16	60	56	22	12	17	1	4

Note: The table does not include food refuse, debitage, or pieces found in construction fill.

DISCUSSION

Whereas bone awls can be used for diverse purposes, bone needles were primarily tied to textile production, which appears to have been mainly women's work (Joyce 1993). The presence of needles along with other pointed bone instruments in Operations 23A and 20A indicates that textile production was carried out in and around Structures M8-4 and M8-8 (House of Mirrors and House of Axes). A relatively small number of these artifacts in Operation 21A possibly reflect the unique function of Structure M7-34 (House of Metates) as a communal house.

Bone and shell ornaments were found mostly in elite residences M8-4 and M8-8 (Operations 23A and 20A). Their residents probably used those ornaments as part of ceremonial and courtly attire. The comparatively moderate number of ornaments found in Operations 14B and C may indicate that Structure M8-13 was a residence occupied by a somewhat lower-status group with less access to these objects. The quantity of bone and shell ornaments is low in Operations 23B and 21A within the probable nonresidential structures M8-2, M8-3, and M7-34, again marking a clear contrast with the elite residences. The substantial part of shell artifacts from Operation 23B was found in the area behind Structure M8-2, which probably represents collapsed materials from the adjacent Palace Group.

The presence of bone debitage and preforms in Operation 23A most likely reflects the production of bone artifacts in and around Structure M8-4, which is also suggested by lithic use-wear data (Emery and Aoyama 2007; Aoyama 2009). Bone debitage remains were also found in Operation 20A, although in smaller numbers. The pattern of shell artifact production appears similar. Whereas a moderate number of shell-working remains were excavated in Operation 23A, comparable remains from Operation 20A are limited. Debitage from bone and shell working was also found in Operation 14B. Some pieces of debitage in Operation 14B were found in the midden west of Structure M8-13, which may have resulted from activities that took place in Structure M8-10. However, others were found in the area behind Structure M8-13, most likely reflecting manufacturing activity in and around this building (Emery and Aoyama 2007). We should note that the most abundant evidence of bone and shell artifact production was found in Structure M8-10 (House of the Scribe) and in the aforementioned midden adjacent to Structures M8-10 and M8-13 during the Petexbatun Project (Operation 14A) (Inomata 1995, 2007a; Emery and Aoyama 2007). Structure M8-10 also contained elaborate bone and shell ornaments, some of which are carved with glyphic texts. It appears that bone and shell working was common practice in elite households, but the residents of Structure M8-10 were more focused on this activity than others. The residents of Structures M8-4, M8-8, and M8-10 probably kept for their own use at least part of the bone and shell artifacts that they produced. In contrast, the residents of Structure M8-13, which contained only a limited number of shell artifacts, may have produced shell ornaments primarily for their patrons. The relative paucity of bone and shell debitage and preforms in Operations 23B and 21A indicates that the functions of Structures M7-34, M8-2, and M8-3 differed from those of the elite residences.

The inventory of bone and shell artifacts in Operations 22A and 22B is fairly similar to that of Operations 23A and 20A. The termination ritual deposits in and around Structures M7-22 and M7-32, from which many of the items from Operations 22A and 22B derived, may have consisted of the materials resulting from pre-abandonment activities carried out by the residents of these royal buildings or nearby elite structures. The number of bone and shell artifacts from the Barranca Escondida (Operation 24) is extremely small (Tables 8.1 and 8.2), indicating that the rituals conducted there were quite different from those of the Palace Group.

Many bone and shell artifacts exhibit evidence of thermal alterations, possibly caused by the fire at the time of abandonment. Thermal effects on shell, including laminations and changes in color, are often difficult to distinguish from mechanical damage at the time of structural collapse and postdepositional weathering, whereas thermal alterations to bone objects are fairly clear, with visible alterations starting at relatively low temperatures. Thus, we find that bone serves as the most sensitive indicator of fire (Table 8.3). Bone objects begin to show darker colors around 285°C and turn mostly black in the temperature range of 300 to 500°C. Those specimens are classified as "slightly burned" in Table 8.3. Bone turns gray around 600°C, and at temperatures of 645°C and above, its organic component is burned away, resulting in calcination distinguished by a white color. Such bone artifacts are classified as "heavily burned" in the table (Richter 1986; McCutcheon 1992; Shipman et al. 1984; Buenger 2003: 29–30, 133–170). Table 8.3 shows that a substantial portion of the bone artifacts found in the Causeway area exhibit evidence of thermal alteration, supporting the hypothesis that buildings in this area were burned at the time of abandonment. In the Palace Group, the ratio of heavily burned bone artifacts is somewhat smaller, probably reflecting a different burning process. These materials may have been burned during termination rituals. We should note that some bone artifacts may have been intentionally fire-hardened for strength before or during their use, but the uneven blackening or calcination of bone ornaments found in the Aguateca structures most likely resulted from the building fires or ritual burning. In addition, many refitted fragments of bone artifacts exhibit different degrees of heat alteration, indicating that they were burned after they broke. The post-abandonment effects of slash-and-burn agriculture were probably minimal because the area around Aguateca was covered by the rain forest after its abandonment.

chapter

9

Aguateca Animal Remains

Kitty Emery

This chapter describes the full assemblage of animal remains recovered by the Aguateca Archaeological Project First Phase and evaluates differences in the taxa, the skeletal elements, and their pre- and postdepositional modifications. This detailed study expands previous studies (Emery 1998, 1999, 2003a, 2003b; Emery and Aoyama 2007) and allows me to suggest the specific activities that surrounded the use, deposition, and preservation of the remains, and thereby to understand the role that these animals played in the elite core structures of Aguateca.

Animal remains are often assumed to be reflective of either subsistence practices (primarily diet) or economic activities (artifact production and distribution). Thus they are often separated into "dietary remains" and "artifacts of bone and shell." Instead, animal remains should be considered in the same terms as other remains, as part of the general archaeological formation process. They too have a history of acquisition (direct or by exchange); primary use as food, medicine, symbol, or secondary product (skin, fat, craft resource); secondary use for any of the same purposes (of remains resulting from primary use); and discard. Distribution through the community also occurs at any stage of this cycle. Further complicating our understanding of animal resource use in ancient communities are the taphonomic processes that influence preservation and secondary deposition. At most sites, it is virtually impossible to know where animal remains were originally discarded, let alone where the resources themselves might have been used and by whom. Still more difficult is the tenuous link between the animal remains found on an archaeological site and the habitats from which they were acquired, since animal acquisition is governed in large part by human choice, itself driven by cultural norms, fashions, and demands.

Aguateca provides a unique opportunity in the Maya area for the study of zooarchaeological remains. The compilation of all data on worked and unworked vertebrate and invertebrate remains allows us to consider the complete repertoire of animal resources used by the Aguateca residents and these resources' many purposes, primary and secondary. The rapid abandonment of the site and resulting de facto refuse in many structures, in combination with the project's superb control over context and reconstruction of structure function, offer us the possibility to link recovery location to specific community members.

METHODS

Zooarchaeological identifications are based on comparisons with type collections from the University of Toronto, Royal Ontario Museum, and Florida Museum of Natural History, Environmental Archaeology Program. Only nonhuman remains are included. Terrestrial molluscs have also been excluded because they were not collected in a standardized way and are also likely intrusive. The taxonomy is defined based on the latest information provided by the Integrated Taxonomic Information System (www.itis.gov) and is presented at the finest possible identification level. Scientific names are provided in Table 9.1, and common names are used throughout the text. The term "cf" is used to mean "most comparable to," indicating that this is a likely, but not confirmed, identification. Skeletal elements are also defined to the finest possible identification level, but these include unidentifiable categories such as "skeletal element" or "carapace/plastron" when the identification cannot be better clarified. Each specimen was also evaluated for age markers (tooth wear, epiphyseal fusion, and occasionally morphological traits) and modifications, including animal markings (gnawing and puncturing), natural markings (root etching, weathering, calcification), burning (charred vs. calcined), butchering (butchering, disarticulation, skinning), and artifactual modifications and use markings (finished vs. production debitage here, but described in detail in Chapter 8).

Taxonomic frequencies are presented as absolute and relative NISP (number of identified specimens), MNE (minimum number of elements), and MNI (minimum number of individuals). MNE was determined by overlapping skeletal element portions (e.g., a distal 0.3+proximal 0.2 were counted as a single element). MNI was estimated using the paired elements method (e.g., Reitz and Wing 1999:195) with age and sex as segregating criteria and residential occupational phases as aggregational units. MNI does not mean the actual number of individuals, but the minimum number that the assemblage could represent. Often more individuals are likely. MNI has been calculated more conservatively than in prior analyses (Emery 2003a) based on archaeological interpretations of shared living spaces. I have aggregated at the structure level with no divisions between living spaces because other archaeological work at the site indicates that each structure was the residence of a single "household" and that each structure's residents stored, prepared, and consumed their food and crafting raw materials separately (Aoyama 2007a; Inomata et al. 2002; Triadan 2000). However, animal product sharing between households and across the community as a part of exchange, tithing, and ceremonial consumption is likely, meaning that MNI is not always the most accurate quantification since it will still overrepresent any individual shared among multiple households. The more direct NISP quantification, however, overestimates any taxa with large numbers of bony remains (such as turtles and armadillos), as well as those for which fragmentation is high (mammalian long bones, for example). The two measures should be considered together as a minimum and maximum representation of animal distribution at the site.

Comparative analyses of assemblages between different structures use relative MNI to counteract sample size discrepancies between the loci, and for taxonomic counts, only non-overlapping or discrete taxa are included. Non-overlapping taxa are those that are not already represented in a separate category (i.e., cervids do not contribute a taxa count if deer are already represented). The identification of artifactual and butchering modifications was given only to specimens with visible traces of these activities. For example, evidence of butchery includes only marks left on bone by cutting the flesh or skin or disarticulating joints. Most flesh cutting leaves no marks on the bone. Similarly, counts of artifactual modifications are only of those specimens with clear evidence of such modification. Several estimating measures used in this study include a rough measure of diversity represented by the number of non-overlapping taxa within all taxa recovered, a rough measure of element completeness that is the MNE/NISP × 100 (the higher the value, the more complete the specimens; the lower the value, the more fragmented the remains), and ubiquity indicated by the number of loci in which the taxa appear. Finally, generalized categories such as "ritual" or "favorite" species do not include all the species that could have been ritually used or favored but rather a few key species that are fairly well acknowledged to have been so classified. This excludes all the other potential species from the category but allows us to concentrate on these as "markers" of variability.

AGUATECA FAUNAL COLLECTION

The faunal collection of the Aguateca Project First Phase studied here was recovered from 12 structures and other discrete locations, and includes 74 taxa (Table 9.1) representing 9,324 specimens and a minimum of 1,405 individuals (Table 9.2). An additional 2,048 specimens representing 504 individuals from earlier excavations in Structure M8-10 are also presented in the structure assemblage descriptions but are not included in the cumulative totals for the First Phase collection. (More details on these materials can be found in Emery 2010.)

The Aguateca animals come primarily from local habitats, but a significant number are exotic and high-status species either from great distances (the Caribbean, Mexican Gulf, and Pacific coasts) or from regionally distant habitats such as savannahs and canopy forests. This is a taxonomically rich assemblage of remains with unusual distributions of both taxa and skeletal elements, providing perspective on a range of ancient animal-related activities within and associated with the Late Classic Aguateca elite court.

Taxonomically, approximately half the Aguateca assemblage specimens are invertebrates (49 percent), but they represent almost 90 percent of the individuals and are found in all structures. Of these, marine exotics are the most frequent (34 percent NISP, 86 percent MNI) and would have been transported from the Caribbean, Mexican Gulf, and Pacific coasts at great cost to the recipients. These elite goods are more common in the Aguateca deposits than in any of the assemblages from the other Petexbatun sites. There they comprise only 4 percent of the NISP and 13 percent of the MNI, and are low even at the site of Dos Pilas, the polity twin capital (5 percent NISP,

Table 9.1. Taxonomic List of Animals from the Aguateca Faunal Assemblages.

Order	Family	Genus	Species	Common Name
Phylum Snidaria, Class Anthozoa				
Scleractinia	Faviidae	—	—	corals
Phylum Mollusca, Class Gastropoda				
Architaenioglossa	Ampullariidae	*Pomacea*	*flagellata*	apple snail
Mesogastropoda	Pleuroceridae	*Pachychilus*	*indiorum*	"smooth" jute
Archaeogastropoda	Patellidae	*Patella*	*mexicana*	Mexican giant limpet
Caenogastropoda	Pediculariidae	*Jenneria*	*pustulata*	pustulate cowry (cf, or possibly a Caribbean species)
Caenogastropoda	Harpidae	*Morum*	*tuberculosum*	lumpy morum harp snail (cf, or possibly a Caribbean species)
Caenogastropoda	Turbinellidae	*Turbinella* [was *Xancus*]	*angulatus*	West Indian chank
Neotaenioglossa	Naticidae	*Polinices*	*duplicatus*	moon snail
Neotaenioglossa	Strombidae	*Strombus*	*gigas*	queen conch
Neotaenioglossa	Strombidae	*Strombus*	*alatus*	Florida fighting conch
Neotaenioglossa	Strombidae	*Strombus*	*pugilis*	West Indian fighting conch
Neotaenioglossa	Strombidae	*Strombus*	*raninus*	hawkwing conch
Neotaenioglossa	Strombidae	—	—	conchs and allies
Neotaenioglossa	Cassididae	*Cassis*	*flammea*	flame helmet
Neotaenioglossa	Cassididae	*Cassis*	*madagascariensis*	emperor or cameo helmet
Neotaenioglossa	Cassididae	—	—	helmet shells
Neotaenioglossa	Cypraeidae	*Cypraea*	*zebra*	measled cowrie
Neotaenioglossa	Cypraeidae	*Cypraea*	*cervinetta*	deer cowrie
Neotaenioglossa	Cypraeidae	*Cypraea*	—	cowries
Neotaenioglossa	Triviidae	—	—	trivias (including cf *Pusula* [was *Trivia*] *pediculus* or similar)
Neogastropoda	Melongenidae	*Busycotypus* [was *Busycon*]	*spiratus* [was *spiratum*]	whelk
Neogastropoda	Olividae	*Oliva*	*porphyria*	Pacific olive
Neogastropoda	Olividae	*Oliva*	*caribaeensis/reticularis*	Caribbean or reticulated olive
Neogastropoda	Olividae	*Oliva*	*sayana*	lettered olive
Neogastropoda	Olividae	—	—	olive snails
Neogastropoda	Olividae	*Olivella*	*perplexa*	dwarf olive
Neogastropoda	Olividae	*Olivella*	*nivea*	snowy dwarf olive
Neogastropoda	Conidae	*Conus*	*jaspideus* [now includes *verrucosus*]	jasper cone
Neogastropoda	Conidae	*Conus*	sp.	cones
Neogastropoda	Conidae	*Pleurotomella*	*bairdi*	mitre shell
Neogastropoda	Fasciolariidae	*Pleuroploca*	*gigantea*	horse conch
Neogastropoda	Fasciolariidae	*Fasciolaria*	*tulipa*	true tulip shell
Neogastropoda	Marginellidae	*Prunum*	*apicinum*	marginella snail
Neogastropoda	Columbellidae	*Columbella*	*rusticoides*	rusty dovesnail
Neogastropoda	Nassariidae	*Nassarius*	*vibex*	bruised nassa
—	—	—	—	marine gastropod
Phylum Mollusca, Class Bivalvia				
Unionoida	Unionidae	*Psoronaias/Nephronaias*	—	river clam
Ostreoida	Spondylidae	*Spondylus*	—	thorny oyster
Ostreoida	Pectinidae	—	—	scallops
Mytiloida	Mytilidae	—	—	mussels
Arcoida	Arcidae	*Anadara*	—	incongruous ark
Arcoida	Arcidae	*Arca*	*umbonata* [was *imbricata*]	mossy ark
—	—	—	—	marine bivalves
—	—	—	—	marine molluscs

Table 9.1. (cont’d.) Taxonomic List of Animals from the Aguateca Faunal Assemblages.

Order	Family	Genus	Species	Common Name
Phylum Chordata (Vertebrata), Class Actinopterygii:Osteichthyes				
Siluriformes	Ictaluridae	—	—	freshwater catfish
Perciformes	Cichlidae	—	—	cichlid fishes
—	—	—	—	ray-finned boney fishes
Phylum Chordata (Vertebrata), Class Amphibia				
Anura	Bufonidae	*Rhinella* [was *Bufo*]	*marina* [was *marinus*]	marine/cane toad
Anura	Ranidae	—	—	frogs
Phylum Chordata (Vertebrata), Class Reptilia				
Squamata:Lacertilia		—	—	lizards
Squamata:Serpentes	Boidae	*Boa*	*constrictor*	boa constrictor
Squamata:Serpentes		—	—	nonboid snake
Crocodilia	Crocodylidae	*Crocodylus*	—	crocodiles
Testudines	Dermatemydidae	*Dermatemys*	*mawii*	Central American river turtle
Testudines	Kinosternidae	*Kinosternon*	—	small mud and musk turtles
Testudines	Kinosternidae	*Staurotypus*	*triporcatus*	large musk turtle
Testudines	Emydidae	*Trachemys*	*scripta*	slider
Testudines	—	—	—	turtles
—	—	—	—	large reptiles (crocodile, large turtle sized)
Phylum Chordata (Vertebrata), Class Aves				
Psittaciformes	Psittacidae	*Amazona*	—	parrots
Galliformes	Phasianidae	*Meleagris*	—	turkeys
—	—	—	—	birds
—	—	—	—	large bird (turkey/raptor sized)
—	—	—	—	intermediate birds (quail/crow sized)
—	—	—	—	small bird (perching bird sized)
Phylum Chordata (Vertebrata), Class Mammalia				
Didelphimorphia	Didelphidae	*Philander*	*opossum*	
Didelphimorphia	Didelphidae	*Didelphis*	*marsupialis*	
Didelphimorphia	Didelphidae	—	—	opossums
Cingulata	Dasypodidae	*Dasypus*	*novemcinctus*	nine-banded armadillo
Chiroptera	Phyllostomidae	*Artibeus*	*literatus*	fruit bat (cf Jamaican fruit bat, could be a similar species)
Carnivora	Procyonidae	*Nasua*	*narica*	white-nosed coati
Carnivora	Procyonidae	*Procyon*	*lotor*	raccoon
Carnivora	Canidae	*Canis*	*lupus familiaris*	domestic dog (and others ID’d as *Canis* sp.)
Carnivora	Canidae/Felidae	—	—	dog and cat
Carnivora	Felidae	*Panthera*	*onca*	jaguar
Carnivora	Felidae	*Leopardus*	*pardalis*	ocelot
Carnivora	Felidae	*Leopardus*	*weidii*	margay
Carnivora	Felidae	—	—	cats
Carnivora	Felidae	—	—	large cats (puma, jaguar)
Carnivora	Felidae	—	—	intermediate cats (large ocelot, jaguarundi)
Carnivora	Felidae	—	—	small cats (margay, small ocelot)
Carnivora	—	—	—	small carnivores (small dogs, cats, mustelids, procyonids)
Artiodactyla	Tayassuidae	*Pecari* [was *Tayassu*]	*tajacu*	collared peccary
Artiodactyla	Tayassuidae	*Tayassu*	*pecari*	white-lipped peccary

Table 9.1. (cont'd.) Taxonomic List of Animals from the Aguateca Faunal Assemblages.

Order	Family	Genus	Species	Common Name
Artiodactyla	Tayassuidae	—	—	peccaries
Artiodactyla	Cervidae	*Odocoileus*	*virginianus*	white-tailed deer
Artiodactyla	Cervidae	*Mazama*	*americana*	red brocket deer
Artiodactyla	Cervidae	*Mazama*	*pandora*	Yucatan brocket deer
Artiodactyla	Cervidae	*Mazama*	—	brocket deers
Artiodactyla	Cervidae	—	—	deers
Artiodactyla	—	—	—	artiodactyls
Rodentia	Muridae [was Cricetidae]	—	—	New World rats and mice
Rodentia	Muridae [was Cricetidae]	*Ototylomys*	*phyllotis*	big-eared climbing rat
Rodentia	Agoutidae [was Dasyproctidae]	*Agouti*	*paca*	paca
Rodentia	Dasyproctidae	*Dasyprocta*	*punctata*	agouti
Rodentia	Agoutidae/ Dasyproctidae	—	—	agoutis and pacas
Rodentia	Sciuridae	*Sciurus*	—	squirrels
	—	—	—	mammals
	—	—	—	small mammals (rabbit, pocket gopher sized)
	—	—	—	intermediate mammals (armadillo, dog sized)
	—	—	—	large mammals (artiodactyls, large cats)
Phylum Chordata (vertebrata)	—	—	—	vertebrates

31 percent MNI; all comparisons calculated from Emery 2010:Tables 4.1 and 4.2). Among the vertebrates, turtles (22 percent NISP, 2 percent MNI), and particularly slider and Central American river turtles, are dominant. Their relative frequency at Aguateca is higher than in the other Petexbatun site assemblages (roughly 10 percent of both NISP and MNI). Artiodactyls (5 percent NISP, 2 percent MNI), particularly white-tailed deer, and dogs are the next most frequent vertebrates at Aguateca, both found in comparable proportions to deer and dog remains at the other Petexbatun sites.

The collection is well preserved in comparison with those from other sites in the Petexbatun region, in large part because of the rapid abandonment that left the remains burned but often covered by structural collapse and therefore protected (Table 9.3). Only 1 percent of the remains were recorded as weathered, poorly preserved, or altered by animal gnawing/chewing. Many of the Aguateca remains were artifactually modified. And many were burned, most likely as a result of the site-wide burning during abandonment.

DISTRIBUTION BY STRUCTURE

Faunal counts by structure including NISP and MNI are provided in Tables 9.4 (invertebrates) and 9.5 (vertebrates). Total site taxa numbers and taxa ubiquity are also provided in these tables. Body portion analyses for select taxa are presented in Table 9.6. Information on the element sides and individual ages can be found in Table 9.7.

Structure M7-22 (House of Masks): Operation 22A

In this analysis, I examine two separate animal remain assemblages: one from the inside of the sealed easternmost room and the nearby area, which mostly consisted of the possessions of the royal family, and the other from the termination ritual deposits placed during the ritual destruction of the building by the enemies.

Structure M7-22 Easternmost Room

The sealed easternmost room of Structure M7-22 contained 11 percent of the site remains by specimen count, although many represent small shells combined into single artifacts (Table 9.3). Weathering of these remains was low,

Table 9.2. Animal Remain Counts and Percentages (Relative to Site Totals) of Number of Specimens (NISP), Minimum Number of Elements (MNE), and Minimum Number of Individuals (MNI).

	Counts					
Identification	NISP	%NISP	MNE	% MNE	MNI	%MNI
Faviidae	1	0.01	1	0.06	1	0.07
Pomacea flagellata	60	0.64	12	0.67	12	0.85
Pachychilus indiorum	5	0.05	5	0.28	5	0.36
Patella mexicana	1	0.01	1	0.06	1	0.07
Jenneria pustulata	7	0.08	7	0.39	7	0.50
Morum tuberculosum	1	0.01	1	0.06	1	0.07
Turbinella angulata	only in M8-10 Petexbatun excavations					
Polinices duplicatus	1	0.01	1	0.06	1	0.07
Strombus gigas	2	0.02	2	0.11	2	0.14
Strombus alatus	3	0.03	3	0.17	3	0.21
Strombus pugilis	4	0.04	3	0.17	3	0.21
Strombus raninus	1	0.01	1	0.06	1	0.07
Strombidae	1080	11.58	12	0.67	11	0.78
Cassididae	121	1.30	4	0.22	4	0.28
Cyprae sp.	5	0.05	5	0.28	5	0.36
Triviidae	27	0.29	23	1.28	23	1.64
Busycotypus spiratus	1	0.01	1	0.06	1	0.07
Oliva porphyria	17	0.18	6	0.34	6	0.43
Oliva caribaeensis/reticularis	328	3.52	166	9.27	166	11.81
Oliva sayana	68	0.73	35	1.96	35	2.49
Olividae	144	1.54	83	4.64	83	5.91
Olivella perplexa	78	0.84	70	3.91	70	4.98
Olivella nivea	5	0.05	5	0.28	5	0.36
Conus sp.	24	0.26	10	0.56	10	0.71
Pleurotomella bairdi	1	0.01	1	0.06	1	0.07
Pleuroploca gigantea	1	0.01	1	0.06	1	0.07
Fasciolaria tulipa	1	0.01	1	0.06	1	0.07
Prunum apicinum	759	8.14	757	42.29	757	53.88
Columbella rusticoides	1	0.01	1	0.06	1	0.07
Nassarius vibex	1	0.01	1	0.06	1	0.07
Gastropoda, marine	269	2.89	5	0.28	1	0.07
Psoronaias/Nephronaias sp.	1334	14.31	32	1.79	24	1.71
Spondylus sp.	130	1.39	7	0.39	5	0.36
Pectinidae	1	0.01	1	0.06	1	0.07
Mytilidae	2	0.02	2	0.11	1	0.07
Anadara sp.	1	0.01	1	0.06	1	0.07
Arca umbonata	1	0.01	1	0.06	1	0.07
Bivalve, marine	1	0.01	1	0.06	1	0.07
Mollusca, marine	52	0.56	1	0.06	0	0.00
Siluriformes (freshwater)	2	0.02	2	0.11	1	0.07
Cichlidae	4	0.04	4	0.22	2	0.14
Osteichthyes	16	0.17	16	0.89	0	0.00
Rhinella marina	1	0.01	1	0.06	1	0.07
Ranidae	1	0.01	1	0.06	1	0.07
Lacertilia	2	0.02	2	0.11	2	0.14
Boa constrictor	1	0.01	1	0.06	1	0.07
not *B. constrictor*	1	0.01	1	0.06	1	0.07
Crocodylus sp.	1	0.01	1	0.06	1	0.07

Table 9.2. (cont'd.) Animal Remain Counts and Percentages (Relative to Site Totals) of Number of Specimens (NISP), Minimum Number of Elements (MNE), and Minimum Number of Individuals (MNI).

	COUNTS					
IDENTIFICATION	NISP	%NISP	MNE	% MNE	MNI	%MNI
Dermatemys mawii	263	2.82	6	0.34	6	0.43
Kinosternon sp.	29	0.31	5	0.28	3	0.21
Staurotypus triporcatus	9	0.10	1	0.06	1	0.07
Trachemys scripta	866	9.29	16	0.89	11	0.78
Testudines	897	9.62	16	0.89	3	0.21
Reptilia, large	only in M8-10 Petexbatun excavations					
Amazona sp.	1	0.01	1	0.06	1	0.07
Meleagris sp.	2	0.02	2	0.11	2	0.14
Aves	5	0.05	4	0.22	0	0.00
Aves, intermediate	4	0.04	3	0.17	3	0.21
Aves, small	2	0.02	1	0.06	1	0.07
Aves, large	2	0.02	2	0.11	0	0.00
Didelphidae	4	0.04	3	0.17	3	0.21
Dasypus novemcinctus	56	0.60	6	0.34	4	0.28
Artibeus lituratus	3	0.03	3	0.17	2	0.14
Nasua narica	1	0.01	1	0.06	1	0.07
Procyon lotor	1	0.01	1	0.06	1	0.07
cf *Canis lupus familiaris*	232	2.49	104	5.81	26	1.85
Canidae/Felidae	126	1.35	62	3.46	9	0.64
Panthera onca	76	0.82	29	1.62	4	0.28
Leopardus pardalis	1	0.01	1	0.06	1	0.07
Leopardus weidii	1	0.01	1	0.06	1	0.07
Felidae	5	0.05	4	0.22	3	0.21
Felidae, large	3	0.03	3	0.17	0	0.00
Felidae, intermediate	3	0.03	2	0.11	1	0.07
Felidae, small	5	0.05	5	0.28	4	0.29
Carnivora, small	6	0.06	6	0.34	1	0.07
Tayassuidae	17	0.18	11	0.61	5	0.36
Odocoileus virginianus	451	4.84	68	3.80	18	1.28
Mazama sp.	18	0.19	12	0.67	7	0.50
Cervidae	26	0.28	9	0.50	0	0.00
Artiodactyla	3	0.03	3	0.17	0	0.00
Muridae	17	0.18	17	0.95	5	0.36
Ototylomys phyllotis	4	0.04	3	0.17	2	0.14
Agouti/Dasyprocta	21	0.23	19	1.06	10	0.71
Sciurus sp.	1	0.01	1	0.06	1	0.07
Mammalia	603	6.47	21	1.17	0	0.00
Mammalia, small	5	0.05	3	0.17	1	0.07
Mammalia, intermediate	132	1.42	17	0.95	1	0.07
Mammalia, large	631	6.77	18	1.01	0	0.00
Vertebrata	224	2.40	1	0.06	0	0.00
Total	9324	100.00	1790	100.00	1405	100.00

TABLE 9.3. Comparisons by Structure of Animal Remain Counts, Number of Taxa, Taphonomic Conditions, and Human Modifications.

	PALACE GROUP			CAUSEWAY AREA									
COUNTS[a]	22B %	22A: TERM. %	22A: RM %	23A %	20A %	14A* %	14B %	23B %	21A: M7-91/92 %	21A: M7-34 %	24A %	26A&B, 27A %	TOTALS* %
NISP	396/4.25	2607/27.96	1048/11.24	2066/22.16	1194/12.81	2048	273/2.93	789/8.46	44/0.47	216/2.32	115/1.23	569/6.10	9324
MNE	82/4.58	186/10.39	747/41.73	142/7.93	291/16.26	—	52/2.91	75/4.19	19/1.06	77/4.30	57/3.18	56/3.13	1790
MNI	44/3.13	129/9.18	715/50.89	99/7.05	236/16.80	504	26/1.85	62/4.41	9/0.64	46/3.27	17/1.21	18/1.28	1405
# taxa	18/24.32	27/36.49	17/22.97	35/47.30	29/39.19	27	17/22.97	14/18.92	8/10.81	14/18.90	15/20.27	17/22.97	74
Taphonomy													
% weathered/animal altered	2.02	0.54	1.24	0.34	0.42		0.73	0.00	9.09	6.48	49.57	0.00	124/1.33
% burned	10.61	62.75	24.43	74.73	64.32		33.33	32.83	31.82	57.41	2.61	95.08	5281/56.64
completeness (MNE:NISP)	20.71	7.13	71.28	6.87	24.37		19.05	9.51	43.18	35.65	49.57	9.84	19.20
Human Modifications													
% butchered	0.25	0.08	0.10	0.44	0.08		0.00	0.13	6.82	0.00	3.48	0.70	26/0.28
% artifacts	35.86	85.92	77.29	17.91	50.92		18.68	10.14	56.82	26.39	6.96	0.70	4397/47.16
% finished of artifacts	85.21	98.04	96.42	70.81	86.35		76.47	55.00	76.00	94.74	62.50	100.00	4051/92.13
% debitage of artifacts	9.15	0.18	0.12	13.51	1.48		21.57	15.00	0.00	3.51	0.00	0.00	103/2.34
% unmodified of artifacts	5.63	1.79	3.46	15.14	12.17		0.00	30.00	24.00	1.75	25.00	0.00	239/5.44

Note: Structure assemblage contexts are as follows: 22B: M7-32 (Palace Termination); 22A: M7-22 (Palace Termination); 22A: M7-22 (Palace Easternmost Room); 23A: M8-4 (Mirrors); 20A: M8-8 (Axes); 14A: M8-10 (Scribe); 14B: M8-13; 23B: M82/3; 21A: M7-91/92; 21A: M7-34 (Metates); 24A (Barranca); 26A&B, 27A (Granada).

[a] Counts by structures are presented as number and percentage of site assemblage; values of taphonomy and modifications are presented as percentage of structure assemblage NISP.

* Totals are based only on First Phase materials and do not include Structure M8-10 data from the Petexbatun Project, which are presented in the column for 14A.

and the elements were very complete. Burning was difficult to ascertain on the shells of the assemblage, which represent a large proportion of the materials, so the low rate of burning misrepresents the very high burning damage seen on other remains in this room (see Volume 1). Very few of the remains show evidence of butchering, but over 75 percent were artifactually altered. Of those artifacts, only a very few were either debitage or unmodified examples of taxa normally modified into artifacts (for example, olives were usually modified into tinklers).

The invertebrate assemblage includes a large number of tinklers (Table 9.4): 682 complete marginella tinklers (Figure 8.15a, 22A10-2-8, Cat. 733-33), six dwarf olives (Figure 8.15c, 22A10-2-6, Cat. 632-9), four reticulated olives (Figure 8.15e, 22A14-2-5, Cat. 354-3), one pustulate cowry, and one bruised nassa. These likely were combined in a single tinkler adornment. The larger marine gastropods included 110 helmet shell fragments (all burned, some carved with glyphs, at least one retaining its spire, but with evidence of cut and smoothed edges along the body whorl), representing one or possibly two helmet shell individuals (Cat. 22A647-10, Figure 13.7). The highly damaged nature of these shells makes both reconstruction and identification difficult. The project conservators interpreted the remains as a single shell, but I noted characteristics pertaining to two species of helmet shell (87 fragments identified as *Cassis flammea* and 23 as *Cassis madagascariensis*), suggesting the possibility that these fragments represent a minimum of two shells of different species. These may have been used as trumpets or simply adornments. Several thorny oyster artifacts, a carved stromb shell adorno (Cat. 22A405-4, Figures 8.14h and 8.15f), and unidentified marine gastropod fragments including three artifacts complete the assemblage. The only freshwater shells in this assemblage were five segments of river clam (two modified), one a portion of valve hinge (Figure 8.15j, 22A10-2-4, Cat. 260-1; 8.15b, 22A10-2-5, Cat. 402-1). The presence of this hinge segment may indicate that at least one of these valves was stored raw material for later shell artifact production, or that at least one of the valves was used complete (perhaps as an ink pot, as postulated for other complete valves elsewhere by Inomata). It is also possible that it was deposited during the termination rituals after the attack and was accidentally mixed with the stored valuables.

The nonmammalian vertebrates of this assemblage are unusual in that no turtle or bird remains were recovered, and the remains consist only of a single fish branchiostegal ray and a lizard tibia (unburned and in such excellent condition that it is likely intrusive) (Table 9.5). Mammalian remains include three unburned armadillo scutes (Figure 8.4k, 22A10-2-7, Cat. 638-37) and two left humeri and a radius of a fruit bat that are likely intrusive, although the element distribution is unusual in including two left wings and nothing else (Table 9.6). The remainder are either dog/cat or artiodactyl remains, most of which were modified. The 58 dog and likely-dog teeth (4 unburned) represent at least seven individuals and include 36 canines and fragments thereof, 3 of them modified by perforation but at least 17 of them complete but unmodified, 2 mandibular carnassials (1 modified), 1 mandibular premolar, and 1 mandibular incisor (see, for example, Figure 8.7n, 22A10-3-3, Cat. 514-1; 8.7m, 22A10-3-1, Cat. 828-75). This assemblage indicates that a range of teeth were being used (or stored) for adornment or some other purpose, in this case primarily canines and mandibular teeth. A single mandibular premolar possibly of a felid, charred and unmodified, was also found with the dog teeth (Figure 8.7l, 22A10-3-3, Cat. 863-3). Identification of dog vs. intermediate cat premolars is often problematic, so it is possible that this is actually a dog tooth.

The large mammal remains include 2 fragments of a left, burned, unmodified peccary femur and 34 white-tailed deer remains, including at least 2 left and 1 right femur (at least 1 adult and 1 juvenile) and possibly 5 separate, carved femur shafts (including 5 almost complete centro-frontal shaft segments with hieroglyphic and image carving that were reconstructed by project members as 2 carved long bones, Cat. 22A524-8 and 22A332-2, Figures 13.4 and 13.5; see also Figure 8.7a, 22A14-2-5, Cat. 332-2). Only 2 of these femur fragments are unburned, and the adult left femur has faint butcher marks, likely from disarticulation. An additional 120 mammal long bone fragments, 21 unburned, include 1 femur fragment and 1 radius central shaft. Some of the long bone fragments are carved, and most are either small bone plaques (23) or wide (blanks? 4), spatulate (10), flat (8), round (1), or triangular (1) profile perforators. Inomata interprets the perforators (Cat. 22A790-109, 22A790-111, 22A803-92; Figures 8.2a–c and 8.7f–h) as possible bloodletters, based on their shape, distribution, and similarity to the bone imitation of a stingray spine from M7-35 (Chapter 8). One spatula tip has been cut and snapped to remove, perhaps during secondary reuse of the artifact (Figure 8.7e, 22A14-3-3, Cat. 864-1). One of the possible blanks has not been smoothed following snapping, suggesting either that this artifact is not finished or that some edges were left without polishing (reminiscent of the interpretation of small bone plaques in M8-4 mounted unfinished-end down into now-deteriorated media).

Of the 1 peccary femur and the minimum of 5 white-tailed deer femurs that were identified, the presence of reduction/production on one segment, the remains of epiphyseal and metaphyseal ends suggesting the use of complete bones, and a removed/reworked spatula tip might suggest that the assemblage includes both artifacts and raw materials for making new ones. The final products might have been both perforators and small bone plaques.

Structure M7-22 Termination Ritual Deposits

The large assemblage of animal remains from the M7-22 termination deposits represents 28 percent of the Aguateca site specimen assemblage and is highly diverse. The remains are not weathered but are highly fragmented and heavily burned. Only a small proportion show evidence of butchering, but almost all are artifactually modified, and most of these are finished artifacts. Few of the artifacts are debitage or unmodified.

The invertebrates of this assemblage were again primarily marine and included only apple snail fragments from a single individual (none modified), a large assemblage of 1,006 river clam valve fragments representing at least 2 individuals, and primarily finished artifacts. This group included 59 unmodified specimens, 16 of which were clearly unmodified valve segments (see, for example, Figure 8.15y', 22A45-3-1, Cat. 1039-34), as opposed to nacre fragments, where modification is difficult to see. It also included possible debitage segments with chipping reduction marks on one segment and cutting scores on another (Figure 8.15 a'', 22A49-3-1, Cat. 1060-1; 8.15v, 22A9-2-3, Cat. 549-1). These may be associated with the river clam valve hinge fragment recovered from the storage area. The marine shell assemblage was much larger and more diverse. Among a large group of tinklers were 4 complete pustulate cowry (Figure 8.16g, 22A45-3-1, Cat. 1039-732), fragments representing 17 helmets, 2 deer cowry juveniles (Figure 8.15a', 22A6-3-1, Cat. 744-13), 5 trivias, 9 cones (Figure 8.16f, 22A45-3-1, Cat. 1039-47, at least 4 tinklers and 4 possibly unworked), and 1 rusty dovesnail. Olive shell tinkler shells and fragments represented 5 reticulated olive tinklers and 1 further modified to a shell plaque (Figure 8.15 c', 22A6-2-3, Cat. 568-10), 15 lettered olives (8 of which were clearly tinklers, 1 a ring segment cut from the upper body whorl and possibly discarded as debitage, 11 large unmodified segments that might indicate complete and unmodified shells), and 2 unidentified olives (1 clearly modified as a tinkler). The many smaller gastropods included at least 27 dwarf olive tinklers and 21 marginella tinklers. In addition to this large assemblage of tinklers were many stromb and unidentified large marine gastropod fragments, most of which were finished beads and disks or adornos with no debitage obvious, though some unmodified segments were found (Figure 8.16a, 22A45-3-1, Cat. 1039-1145). Marine bivalves included thorny oyster worked artifacts representing a minimum of 1 individual but likely more (see, for example, Figure 8.12e', 22A6-3-1, Cat. 740-34) and an unmodified incongruous ark valve fragment.

The vertebrate assemblage is also very similar to that found in the storage area, including 3 fish dorsal spines and 2 precaudal vertebrae, likely representing a single local freshwater fish body (missing the head), 1 possibly intrusive but burned frog/toad long bone, and only a tiny proportion of turtle in comparison to most assemblages from the site. The turtles included only 2 fragments of Central American river turtle carapace (burned), 2 slider carapaces (burned and one modified to a finished disk), and 1 unidentifiable fragment. A single intermediate-sized bird is represented by 2 long bone fragments, likely of the same element (unburned). A single, left, adult rodent mandibular incisor is unburned and well preserved, and possibly intrusive. The other vertebrates are dominated again by dogs, cats, and artiodactyls.

Dog remains represented a minimum of 3 dogs. Most of the elements are teeth, including 29 canines (12 of which are perforated and 16 of which are too fragmentary to tell, and only 16 of which are burned), 3 incisors (2 complete unmodified examples and 1 perforated, none burned), and 1 mandibular premolar (unmodified, unburned). An additional 52 specimens representing 2 individuals could be identified only as canid/felid but are most likely dogs as well. These include 19 canines (10 perforated and 3 complete unmodified examples), fragments representing 4 complete incisors, and additional tooth fragments representing 9 modified and 12 unmodified teeth. A single dog proximal phalanx shaft and another dog/cat complete proximal phalanx were also found, indicating that the remains might represent more than just tooth adornments and might in fact include other elements as adornments, carcass portions, or perhaps hides. Nine jaguar fragments represent a single adult individual and include 1 complete left humerus and the distal shaft of a right, 2 fragments of a left tibia (1 charred) and 1 large felid tibia fragment

Table 9.4. Number of Invertebrate Specimens (NISP or N) and Individuals (MNI or M) in the Structure Assemblages.

	Palace Group						Barranca		Granada	
	22B: M7-32 Palace (Termination)		22A: M7-22 Palace (Termination)		22A: M7-22 Palace (Easternmost Room)		24A		26A&B, 27A	
Taxon	%NISP	%MNI	%NISP	%MNI	%NISP	%MNI	%NISP	%MNI	%NISP	%MNI
Pachychilus indiorum	0.25	2.27					0.87	5.88		
Pomacea flagellata	4.04	2.27	0.27	0.78			0.87	5.88		
Psoronaias/Nephronaias sp.	17.93	2.27	38.59	1.55	0.48	0.14				
Freshwater Shell	**22.22**	**6.82**	**38.86**	**2.33**	**0.48**	**0.14**	**1.74**	**11.76**		
Strombs	**13.64**	**2.27**	**34.37**	**0.78**	**0.29**	**0.14**	**1.74**	**11.76**	**0.18**	**5.56**
Busycotypus spiratus										
Fasciolaria tulipa										
Pleurotomella bairdi										
Pleuroploca gigantea										
Turbinella angulata										
Large Marine Gastropods	**15.66**	**4.55**	**34.37**	**0.78**	**10.78**	**0.42**	**1.74**	**11.76**	**0.18**	**5.56**
Jenneria pustulata [a]			0.15	3.10	0.10	0.14				
Morum sp.[a]										
Nassarius vibex					0.10	0.14				
Triviidae [a]	0.25	2.27	1.00	17.05						
Olives	**5.81**	**25.00**	**2.72**	**37.21**	**0.95**	**1.40**	**0.87**	**5.88**		
Oliva porphyria [a]	4.29	13.64								
Cyprae sp.			0.08	1.55						
Conus sp.	0.25	2.27	0.88	6.98						
Polinices duplicatus										
Prunum apicinum	1.77	15.91	0.81	16.28	65.27	95.38				
Columbella rusticoides			0.04	0.78						
Marine Gastropods	**27.27**	**50.00**	**46.45**	**83.72**	**77.86**	**97.48**	**5.22**	**17.65**	**0.18**	**5.56**
Arca umbonata							0.87	5.88		
Spondylus sp.	6.57	2.27	3.22	0.78						
Pectinidae										
Patella mexicana [a]										
Mytilidae										
Anadara sp.			0.04	0.78						
Marine Bivalves	**6.57**	**2.27**	**3.34**	**1.55**			**0.87**	**5.88**		
Marine Shell	**33.84**	**52.27**	**49.79**	**85.27**	**77.86**	**97.48**	**6.09**	**23.53**	**0.18**	**5.56**
Faviidae										
Pacific	**4.29**	**13.64**	**0.15**	**3.10**	**0.10**	**0.14**				
Invertebrate Total Counts	**222**	**26**	**2311**	**113**	**821**	**698**	**9**	**6**	**1**	**1**
Invertebrate % of All Fauna	**56.06**	**59.09**	**88.65**	**87.60**	**78.34**	**97.62**	**7.83**	**35.29**	**0.18**	**5.56**

	Causeway Area													
	23A: M8-4 (Mirrors)		20A: M8-8 (Axes)		14A: M8-10 (Scribe)*		14B: M8-13		23B: M8-2/3		21A: M7-91/92		21A: M7-34 (Metates)	
Taxon	%N	%M	%N	%M	%N	%M	%N	%M	%N	%M	%N	%M	%N	%M
Pachychilus indiorum					4.00	16.27	1.10	11.54						
Pomacea flagellata	1.02	4.04	0.08	0.42	0.59	0.20	3.66	7.69	0.51	3.23				
Psoronaias/Nephronaias sp.	2.27	8.08	14.32	0.85	5.47	4.96	5.49	7.69	1.01	6.45	6.82	11.11	2.78	2.17
Freshwater Shell	**3.29**	**12.12**	**14.41**	**1.27**	**10.06**	**22.22**	**10.26**	**26.92**	**1.52**	**9.68**	**6.82**	**11.11**	**2.78**	**2.17**
Strombs	**2.27**	**9.09**	**5.36**	**0.42**	**0.44**	**1.19**	**0.73**	**3.85**	**0.38**	**1.61**	**36.36**	**11.11**	**0.93**	**2.17**
Busycotypus spiratus	0.05	1.01			0.05	0.20								
Fasciolaria tulipa									0.13	1.61				
Pleurotomella bairdi			0.08	0.42										
Pleuroploca gigantea	0.05	1.01												

Table 9.4. (cont'd.) Number of Invertebrate Specimens (NISP or N) and Individuals (MNI or M) in the Structure Assemblages.

	Causeway Area													
	23A: M8-4 (Mirrors)		20A: M8-8 (Axes)		14A: M8-10 (Scribe)*		14B: M8-13		23B: M8-2/3		21A: M7-91/92		21A: M7-34 (Metates)	
Taxon	%N	%M	%N	%M	%N	%M	%N	%M	%N	%M	%N	%M	%N	%M
Turbinella angulata					0.15	0.60								
Large Marine Gastropods	**2.52**	**12.12**	**5.44**	**0.85**	**0.49**	**1.19**	**0.73**	**3.85**	**0.51**	**3.23**	**36.36**	**11.11**	**0.93**	**2.17**
Jenneria pustulata [a]	0.10	2.02												
Morum sp.[a]	0.05	1.01												
Nassarius vibex														
Triviidae [a]														
Olives	**2.95**	**42.42**	**19.35**	**75.42**	**18.07**	**69.25**	**2.20**	**23.08**	**25.60**	**75.81**	**4.55**	**22.22**	**15.28**	**43.48**
Oliva porphyria [a]					0.24	0.99								
Cyprae sp.	0.05	1.01	0.08	0.42			0.37	3.85						
Conus sp.														
Polinices duplicatus	0.05	1.01												
Prunum apicinum	0.10	2.02	2.60	13.14									6.48	30.43
Columbella rusticoides														
Marine Gastropods	**8.91**	**61.62**	**27.97**	**89.83**	**19.68**	**71.03**	**3.66**	**34.62**	**26.49**	**79.03**	**40.91**	**33.33**	**24.54**	**76.09**
Arca umbonata														
Spondylus sp.	0.82	1.01	0.17	0.42	0.15	0.20							0.46	2.17
Pectinidae	0.05	1.01												
Patella mexicana [a]	0.05	1.01												
Mytilidae	0.10	1.01												
Anadara sp.														
Marine Bivalves	**3.15**	**4.04**	**0.67**	**0.42**	**0.15**	**0.20**	**0.37**	**3.85**	**0.00**	**0.00**			**0.46**	**2.17**
Marine Shell	**12.05**	**65.66**	**28.64**	**90.25**	**19.82**	**71.23**	**4.03**	**38.46**	**26.49**	**79.03**	**40.91**	**33.33**	**25.00**	**78.26**
Faviidae	0.05	1.01												
Pacific	**0.19**	**4.04**			**0.24**	**0.99**								
Invertebrate Total Counts	**318**	**78**	**514**	**216**	**612**	**504**	**39**	**17**	**221**	**55**	**21**	**4**	**60**	**37**
Invertebrate % of All Fauna	**15.39**	**78.79**	**43.05**	**91.53**	**29.88**	**92.66**	**14.29**	**65.38**	**28.01**	**88.71**	**47.73**	**44.44**	**27.78**	**80.43**

	Aguateca Totals*			
Taxon	%NISP	%MNI	#Taxa	Ubiquity
Pachychilus indiorum	0.05	0.36	1	3
Pomacea flagellata	0.64	0.85	1	7
Psoronaias/Nephronaias sp.	14.31	1.71	2	10
Freshwater Shell	**15.00**	**2.92**	**4**	**11**
Strombs	**11.69**	**1.42**	**4**	**11**
Busycotypus spiratus	0.01	0.07	1	1
Fasciolaria tulipa	0.01	0.07	1	1
Pleurotomella bairdi	0.01	0.07	1	1
Pleuroploca gigantea	0.01	0.07	1	1
Turbinella angulata				
Large Marine Gastropods	**13.03**	**1.99**	**9**	**11**
Jenneria pustulata [a]	0.08	0.50	1	3
Morum sp.[a]	0.01	0.07	1	1
Nassarius vibex	0.01	0.07	1	1
Triviidae [a]	0.29	1.64	1	2
Olives	**6.86**	**25.98**	**5**	**10**
Oliva porphyria [a]	0.18	0.43	1	1
Cyprae sp.	0.05	0.36	1	4
Conus sp.	0.26	0.71	1	3
Polinices duplicatus	0.01	0.07	1	1
Prunum apicinum	8.14	53.88	1	6
Columbella rusticoides	0.01	0.07	1	1
Marine Gastropods	**31.64**	**85.41**	**23**	**11**
Arca umbonata	0.01	0.07	1	1
Spondylus sp.	1.39	0.36	1	5
Pectinidae	0.01	0.07	1	1
Patella mexicana[a]	0.01	0.07	1	1
Mytilidae	0.02	0.07	1	1
Anadara sp.	0.01	0.07	1	1
Marine Bivalves	**2.03**	**0.78**	**7**	**7**
Marine Shell	**33.67**	**86.19**	**30**	**11**
Faviidae	0.01	0.07	1	1
Pacific	**0.28**	**1.07**	**4**	**4**
Invertebrate Total Counts	**4539**	**1253**	**35**	**12**
Invertebrate % of All Fauna	**48.68**	**89.18**		

Note: All values are percentages of structure assemblage totals. Counts in bold are combined values for various taxas.

[a] Pacific species.

* Totals are based only on the First Phase collection and do not include Structure M8-10 data from the Petexbatun Project, which are presented in column for 14A.

Table 9.5. Number of Vertebrate Specimens (NISP or N) and Individuals (MNI or M) in the Structure Assemblages.

	Palace Group						Barranca		Granada	
	22B: M7-32 Palace (Termination)		22A: M7-22 Palace (Termination)		22A: M7-22 Palace (Easternmost Room)		24A		26A&B, 27A	
Taxon	%NISP	%MNI	%NISP	%MNI	%NISP	%MNI	%NISP	%MNI	%NISP	%MNI
Cichlidae									0.53	5.56
Siluriformes									0.35	5.56
Total Fish			**0.12**	**0.00**	**0.10**	**0.00**			**2.81**	**11.11**
Total Amphibians			**0.04**	**0.78**			**0.87**	**5.88**		
Crocodylus sp.									0.18	5.56
Lacertilia					0.10	0.14				
Total Snakes	**0.25**	**2.27**							**0.18**	**5.56**
Dermatemys mawii			0.08	0.78					2.64	5.56
Kinosternon sp.									0.70	5.56
Staurotypus triporcatus									1.58	5.56
Trachemys scripta			0.08	0.78					0.35	5.56
Total Turtles	**2.27**	**2.27**	**0.19**	**1.55**			**0.87**	**5.88**	**42.88**	**22.22**
Total Reptiles	**2.53**	**4.55**	**0.19**	**1.55**	**0.10**	**0.14**	**0.87**	**5.88**	**43.23**	**33.33**
Amazona sp.	0.25	2.27								
Meleagris sp.										
Galliforms and likely			**0.08**	**0.78**			**0.87**	**5.88**		
Total Birds	**0.25**	**2.27**	**0.08**	**0.78**			**0.87**	**5.88**	**0.35**	**5.56**
Didelphidae							0.87	5.88		
Dasypus novemcinctus					0.29	0.14			0.18	5.56
Artibeus lituratus					0.29	0.28				
Coatis/Raccoons										
Dogs	13.89	18.18	1.30	2.33	0.57	0.28	0.87	5.88	0.88	5.56
Leopardus pardalis										
Leopardus weidii										
Felidae, not large	**0.76**	**4.55**	**0.12**	**0.78**					**0.18**	**5.56**
Panthera onca			0.35	1.55			57.39	5.88		
Large Cats			**0.38**	**1.55**			**57.39**	**5.88**		
Total Cats	**0.76**	**4.55**	**0.50**	**2.33**	**0.10**	**0.14**	**57.39**	**5.88**	**0.18**	**5.56**
Tayassuidae	1.01	2.27			0.19	0.14				
Odocoileus virginianus	4.80	9.09	1.73	1.55	3.24	0.42	0.87	5.88	0.18	5.56
Mazama sp.			0.04	0.78						
Cervids	**4.80**	**9.09**	**1.76**	**2.33**	**3.24**	**0.42**	**0.87**	**5.88**	**0.18**	**5.56**
Artiodactyls	**5.81**	**11.36**	**1.76**	**2.33**	**3.44**	**0.56**	**0.87**	**5.88**	**0.35**	**5.56**
Agouti/Paca							2.61	11.76	1.94	11.11
Sciurus sp.									0.18	5.56
Ototylomys phyllotis									0.35	5.56
Muridae			0.04	0.78	0.10	0.14	10.43	11.76		
Total Mammals	**38.13**	**34.09**	**10.89**	**9.30**	**21.37**	**2.24**	**89.57**	**47.06**	**26.01**	**44.44**
Total Vertebrate Counts	**174**	**18**	**296**	**16**	**227**	**17**	**106**	**11**	**568**	**17**
Total Vertebrate %	**43.94**	**40.91**	**11.35**	**12.40**	**21.66**	**2.38**	**92.17**	**64.71**	**99.82**	**94.44**

TABLE 9.5. (cont'd.) Number of Vertebrate Specimens (NISP or N) and Individuals (MNI or M) in the Structure Assemblages.

	CAUSEWAY AREA													
	23A: M8-4 (MIRRORS)		20A: M8-8 (AXES)		14A: M8-10 (SCRIBE)*		14B: M8-13		23B: M8-2/3		21A: M7-91/92		21A: M7-34 (METATES)	
TAXON	%N	%M	%N	%M	%N	%M	%N	%M	%N	%M	%N	%M	%N	%M
Cichlidae			0.08	0.42										
Siluriformes														
Total Fish			**0.08**	**0.42**	0.15	**0.20**							**0.46**	**0.00**
Total Amphibians														
Crocodylus sp.					0.10	0.20								
Lacertilia			0.08	0.42										
Total Snakes														
Dermatemys mawii	10.12	1.01			2.25	0.20	9.52	3.85	0.25	1.61			4.17	2.17
Kinosternon sp.	1.11	1.01	0.17	0.42	6.15	0.20								
Staurotypus triporcatus														
Trachemys scripta	5.61	3.03	15.91	0.85	3.32	0.60	0.37	3.85	64.26	1.61			21.76	2.17
Total Turtles	**42.74**	**5.05**	**25.04**	**1.27**	**28.17**	**0.99**	**15.02**	**7.69**	**65.27**	**3.23**	**4.55**	**11.11**	**29.63**	**4.35**
Total Reptiles	**42.74**	**5.05**	**25.13**	**1.69**	**28.22**	**1.19**	**15.02**	**7.69**	**65.27**	**3.23**	**4.55**	**11.11**	**29.63**	**4.35**
Amazona sp.														
Meleagris sp.					0.20	0.20	0.37	3.85					0.46	2.17
Galliforms and likely	**0.05**	**1.01**			**0.20**	**0.20**	**0.37**	**3.85**					**1.39**	**2.17**
Total Birds	**0.29**	**1.01**			**0.49**	**0.40**	**0.37**	**3.85**					**1.39**	**2.17**
Didelphidae			0.08	0.42									0.93	2.17
Dasypus novemcinctus	0.15	1.01	4.10	0.42	0.59	0.20								
Artibeus lituratus														
Coatis/Raccoons	**0.05**	**1.01**									**2.27**	**11.11**		
Dogs	2.52	5.05	5.03	1.27	0.83	0.40	1.10	3.85			15.91	11.11	4.17	2.17
Leopardus pardalis													0.46	2.17
Leopardus weidii			0.08	0.42										
Felidae, not large			**0.17**	**0.85**									**0.46**	**2.17**
Panthera onca	0.05	1.01			0.10	0.20								
Large Cats	**0.15**	**1.01**			**0.24**	**0.20**								
Total Cats	**0.15**	**1.01**	**0.34**	**1.27**	**0.54**	**0.40**	**0.73**	**3.85**					**0.46**	**2.17**
Tayassuidae			0.08	0.42	0.44	0.40			0.13	1.61			4.17	2.17
Odocoileus virginianus	14.04	2.02	1.84	0.42	2.59	1.19	11.72	7.69	0.76	1.61				
Mazama sp.	0.34	1.01	0.34	0.42	0.29	0.40	0.37	3.85	0.25	1.61			1.39	4.35
Cervids	**15.30**	**3.03**	**2.35**	**0.85**	**3.13**	**1.59**	**12.45**	**11.54**	**1.01**	**3.23**			**3.24**	**4.35**
Artiodactyls	**15.30**	**3.03**	**2.43**	**1.27**	**3.76**	**1.98**	**12.45**	**11.54**	**1.14**	**4.84**			**8.33**	**6.52**
Agouti/Paca	0.15	2.04	0.08	0.42	0.20	0.40	0.37	3.85	0.13	1.61	2.27	11.11		
Sciurus sp.														
Ototylomys phyllotis											6.82	11.11		
Muridae			0.25	0.42										
Total Mammals	**39.69**	**15.15**	**31.66**	**6.36**	**36.08**	**5.56**	**69.60**	**23.08**	**6.59**	**8.06**	**43.18**	**44.44**	**36.57**	**13.04**
Total Vertebrate Counts	**1748**	**21**	**680**	**20**	**1436**	**37**	**234**	**9**	**568**	**7**	**23**	**5**	**156**	**9**
Total Vertebrate %	**84.61**	**21.21**	**56.95**	**8.47**	**70.12**	**7.34**	**85.71**	**34.62**	**71.99**	**11.29**	**52.27**	**55.56**	**72.22**	**19.57**

Table 9.5. (cont'd.) Number of Vertebrate Specimens (NISP or N) and Individuals (MNI or M) in the Structure Assemblages.

	Aguateca Totals*			
Taxon	%NISP	%MNI	#Taxa	Ubiquity
Cichlidae	0.04	0.14	1	2
Siluriformes	0.02	0.07	1	1
Total Fish	**0.24**	**0.21**	**2**	**8**
Total Amphibians	**0.02**	**0.14**	**2**	**4**
Crocodylus sp.	0.01	0.07	1	1
Lacertilia	0.02	0.14	1	2
Total Snakes	**0.02**	**0.14**	**2**	**12**
Dermatemys mawii	2.82	0.43	1	6
Kinosternon sp.	0.31	0.21	1	3
Staurotypus triporcatus	0.10	0.07	1	1
Trachemys scripta	9.29	0.78	1	8
Total Turtles	**22.14**	**1.71**	**4**	**11**
Total Reptiles	**22.19**	**2.06**	**8**	**12**
Amazona sp.	0.01	0.07	1	1
Meleagris sp.	0.02	0.14	1	3
Galliforms and likely	**0.09**	**0.36**	**3**	**6**
Total Birds	**0.17**	**0.50**	**5**	**7**
Didelphidae	0.04	0.21	1	2
Dasypus novemcinctus	0.60	0.28	1	4
Artibeus lituratus	0.03	0.14	1	1
Coatis/Raccoons	**0.02**	**0.14**	**2**	**3**
Dogs	2.49	1.85	1	10
Leopardus pardalis	0.01	0.07	1	1
Leopardus weidii	0.01	0.07	1	1
Felidae, not large	**0.11**	**0.50**	**4**	**5**
Panthera onca	0.82	0.28	1	3
Large Cats	**0.85**	**0.28**	**1**	**7**
Total Cats	**1.01**	**1.00**	**6**	**9**
Tayassuidae	0.18	0.36	1	5
Odocoileus virginianus	4.84	1.28	1	10
Mazama sp.	0.19	0.50	1	6
Cervids	**5.31**	**1.78**	**2**	**11**
Artiodactyls	**5.52**	**2.14**	**4**	**11**
Agouti/Paca	0.23	0.71	2	7
Sciurus sp.	0.01	0.07	1	1
Ototylomys phyllotis	0.04	0.14	1	2
Muridae	0.18	0.36	1	4
Total Mammals	**26.30**	**7.62**	**22**	**12**
Total Vertebrate Counts	**4785**	**148**	**39**	**12**
Total Vertebrate %	**51.32**	**10.53**		

Note: All values are percentages of structure assemblage totals. Counts in bold are combined values for various taxas.

*Totals are based only on the First Phase collection and do not include Structure M8-10 data from the Petexbatun Project, which are presented in column for 14A.

with small cut marks, indicating skinning, likely from the same individual. The cats also included at least 1 adult, intermediate-sized cat individual represented by a distal left humerus and 2 maxillary canine crown fragments (unworked, all unburned). Eight fragments of these cat remains were either weathered or in a poor state of preservation, suggesting that they were more exposed to the elements than were other remains from this assemblage.

Forty-five white-tailed deer specimens included fragments from 1 juvenile femur and 1 adult left femur (3 fragments burned, none worked), 1 right and 1 left humerus (1 fragment burned and 1 with cut marks at the distal end, 2 weathered), 1 adult left radius (unmodified, weathered), and likely a single, right adult tibia (unmodified). A single brocket deer specimen was a fragment of an adult right femur (unburned and unworked). Fifteen large mammal specimens, likely part of the white-tailed skeleton but possibly pertaining to the jaguar, include 1 fragment of femur and various long bone fragments, among them 5 finished artifacts (1 possibly a blank), none of which was weathered. A single worked cranial fragment is intriguing, as there is no other evidence of working of any of the large mammals.

Other unidentifiable mammalian remains include 4 canine fragments likely from dogs or cats, 3 cranium fragments (1 of which was worked, possibly in the process of production, likely associated with the cranial working indicated by the large mammal remains), and fragments from humerus, femur, tibia (1 modified to a rasp), and unidentified long bone (11 from finished artifacts).

Structure M7-32 (House of Bones): Operation 22B

The much smaller assemblage from Structure M7-32 represents just 4 percent of the site specimens and includes fewer taxa. The remains are slightly weathered and have a fairly low completeness value, but very few of them are burned. As in other deposits, few of the remains have evidence of butchering, but in this case, only 36 percent of the remains were artifactually altered. A somewhat lower proportion were finished artifacts and slightly more were either debitage or unmodified artifacts, quite unlike the other termination deposits.

A higher proportion of this assemblage was freshwater shell, including a single jute, at least 1 apple snail, though likely more (all unmodified), and many river clam fragments representing at least 1 individual. The river clam remains included remains from 8 valve body segments, 1 of which was modified to an adorno, and the rest of the fragments were artifacts made of nacre (1 with the Aguateca emblem glyph; Figure 13.8, 22B43-3-4, Cat. 544-1). The marine shell assemblage included fragments representing 1 trivia tinkler (Figure 8.17f, 22B43-3-3, Cat. 535-7), at least 6 olive tinklers, 1 cone shell tinkler (Figure 8.17e, 22B3-3-2, Cat. 185-3), and 7 marginella tinklers (Figure 8.17h, 22B2-3-3, Cat. 209-5). This tinkler assemblage, though, included one of the most important finds of the Aguateca shells: 17 fragments representing 6 individuals of a large and spectacular Pacific olive (Cat. 22B494-1 and 22B185-4, Figures 8.12a and 8.17a, b). Four of these remains were clearly in production, in the process of being cut/chipped into plaques, and another 4 fragments (representing 3 shells) were the discarded spires of the shells removed during production. The perforations of these shells are chipped and rough, and possibly also unfinished. Other larger marine gastropod examples included stromb segments representing a queen conch disk (Figure 8.17z, 22B3-3-1, Cat. 725-8) and 24 other finished artifacts (mostly adornos and beads, but 4 segments in a final stage of production or finishing; for example, see Figure 8.16s, 22B55-3-2, Cat. 590-1), 8 helmet shell segments (1 possibly of a finished shell bowl [Figure 8.17x, 22B42-2-4, Cat. 382-1] and 3 other finished adornos), and other marine gastropod finished adornments. Thorny oyster valve segments representing at least 1 individual were also found, all cut to finished adornment or mosaic pieces (Figure 8.17g', 22B3-3-1, Cat. 165-5).

The vertebrate assemblage of this structure was, again, primarily from large mammals. A single boa constrictor vertebra (unburned and possibly intrusive) and 9 unidentifiable fragments of turtle shell represented the reptiles, while a complete fused right parrot humerus represented the birds. Again, the mammals included dog, cat, and artiodactyls. The dog remains included 43 dog canine fragments, representing 16 modified and 7 complete unmodified teeth (for a total of 23 teeth, 3 of which were burned); 3 carnassial fragments, 1 of which was clearly burned and none modified; 3 maxillary incisors (3 perforated, none burned); and 2 unmodified and unburned molars (Figure 8.7d', 22B42-3-3, Cat. 430-19). Several unburned nontooth elements were also recovered, including a single left mandible with an embedded premolar (unburned and unmodified), a complete metacarpal, and a juvenile distal radius. Three perforated mandibular canines from 2 small felids, all complete, were also found (Figure 8.7c', 22B3-3-2, Cat. 184-8).

The artiodactyls of this assemblage include a series of cranial fragments from a peccary: auditory meatis, glenoid foissa, and a right orbital arch (1 charred). Seventeen fragments of unburned large mammal cranium are also likely part of this almost complete peccary cranium. A large mammal right mandible with no teeth (charred) and a mammalian mandibular shaft fragment could also belong with the peccary cranium. A single peccary fibula (left and unburned) also suggests the possibility of other peccary postcranial remains, or at least of distal limb elements. White-tailed deer remains are significantly different, including at least 4 individuals represented by 12 femur fragments (at least 6 elements, 1 of which was juvenile [a left], 2 of which were adult [right and left femurs], and almost complete shafts from 4 right and 2 left elements), 2 humerus elements (1 left and 1 right, 1 eroded, none burned), 2 tibia fragments, one of which was a charred tibial awl, and 1 unburned right tarsal. At least 1 fragment of carved long bone was also identified as white-tailed deer. Large mammal and mammalian remains may pertain to these deer individuals, although they are predominantly finished artifacts. These include 25 fragments of long bone (9 burned, 9 finished perforator segments [see, for example, Figure 8.1f, 22B13-3-1, Cat. 494-7], 3 of which might be blanks, and 3 blanks in production/reduction). A single proximal phalanx was also recovered, neither burned nor eroded.

The termination deposits found in and around Structures M7-22 and M7-32 seem to be very similar to abandoned goods found in other structures (i.e., they do not resemble midden garbage) with a heavy emphasis on highly elite goods (suggesting that they came from the structures themselves or the neighboring high elite structures), but the deposits of the two structures are not very similar to each other. While the M7-22 termination deposits include large proportions of debitage from river clam artifact manufacture and very few remains suggesting working of strombs or olives (except secondarily some of the larger olives), the assemblage from Structure M7-32 suggests crafting of strombs and most importantly the rare elite Pacific olives. While Structure M7-22 contains fish body elements and a few turtle remains, M7-32 has no fish but does have a boa and a parrot wing bone, possibly intrusive but possibly ritually important. Both termination deposits contain large numbers of dog teeth, both perforated and not, suggesting dog tooth adornments but also cranial and postcranial elements that might suggest dog carcasses or a dog front limb (particularly in Structure M7-32) or skins (particularly in Structure M7-22). The possible carcass of a jaguar is represented in Structure M7-22 by front and rear limbs but no crania. Another front limb and more teeth, this time of an intermediate-sized cat, were also found in Structure M7-22. No cat remains at all were found in Structure M7-32. Artiodactyls in both Structures M7-22 and M7-32 appear to include large numbers of front and rear limbs, but there is little or no evidence of their reduction into artifacts. Are these perhaps the remains of deer haunch food, offerings, or feast foods? Finally, we find another peccary cranium in Structure M7-32 but no crania in Structure M7-22.

Structure M8-4 (House of Mirrors): Operation 23A

The Structure M8-4 assemblage represents almost a quarter of the site specimens and includes 35 taxa. Less than half a percent of these remains were weathered, but the elements record a very low completion ratio and most were burned. Few of the remains were butchered or artifactually modified, but of those, approximately 30 percent were debitage (all examples of secondary or final finishing of artifacts) and unmodified examples of artifactual taxa. Shell and bone remains were found throughout the structure, but primarily in the north room and addition and to a lesser extent in the center room (see Figures 14.8, 14.9).

The M8-4 assemblage includes a very diverse mix of marine invertebrates, among them a coral head fragment (perforated) found inside the north room and several taxa used as tinklers: cowries (Figure 8.19j, 23A30-3-2, Cat. 1733-24), lumpy morum harp snail (Figure 8.17m', 23A15-3-1, Cat. 1904-2), reticulated olives (18) and other olives (19), dwarf olives (3), marginellas (2), and moon snails (1). These include only 5 clearly unmodified individuals. There is no evidence of removed spires or debitage except for 1 tinkler specimen apparently secondarily cut into a plaque, suggesting that tinkler crafting was not being done in this structure. Strombs and other large marine gastropods were also very common, including 3 finished artifacts of queen conch and helmet shell (Figure 8.17c', 23A15-2-1, Cat. 1404-1; Figure 8.19g, 23A22-3-1, Cat. 1478-1; Figure 8.14a, 23A41-3-3, Cat. 1104-3), a complete unmodified whelk body whorl, an almost complete unmodified Florida fighting conch (Figure 8.19e, 23A30-3-4, Cat. 1492-1), a complete and unmodified West Indian fighting conch (Figure 8.19u, 23A7-3-3, Cat. 401-2), 2 finished adornments (Figure 8.14j, 23A17-3-4, Cat. 1180-3), 1 hawkwing conch adornment (Figure 8.15z', 22A40-2-1, Cat. 951-1), and many other fragments, including both finished adornments and debitage, and removed spire fragments.

With the exception of the West Indian fighting conch (south room) and some of the finished queen conch and helmet shell artifacts (center room), most of these were found in the north room. However, the debitage fragments were predominantly found in the south room. This assemblage strongly suggests the working of large marine gastropods in this structure, including import of complete shells as raw materials (Florida fighting conch, West Indian fighting conch, and whelk), removal of spires, cutting of body into disks, and crafting of various kinds of adornments.

Also included among the gastropods was a horse conch, perhaps modified as a flute with removed aperture lip and spire tip, and 3 perforations in a row on the body, found in the north room (Figure 8.19c, 23A17-3-2, Cat. 946-1). Marine bivalves included an unmodified scallop segment from the center room. In the north room, there was 1 Mexican giant limpet that was worked on the edges, perhaps crafted to a shallow dish, although others at Copan were modified to pectorals, so perhaps modified as an adorno (Figure 8.18a'', 23A32-3-3, Cat. 1480-1).

In addition, in the center room there were fragments representing at least 1 thorny oyster (and likely 2, based on different wear patterns on the shells; see Figure 8.19j', 23A10-3-4, Cat. 750-3; Figure 8.17h', 23A48-3-3, Cat. 2123-4; Figure 8.18f, 23A48-3-4, Cat. 2034-3) and 2 beach-worn unmodified marginal edge specimens that may be debitage (Figure 8.17j', 23A48-3-3, Cat. 2040-2). Also included in the north room assemblage were 2 mussel nacre pearls (a matched set; Figure 8.18h', 23A42-3-2, Cat. 1997-40). Freshwater shells included fragments representing a minimum of 4 individuals of apple snail (2 perforated, inside the north room and north addition) and a minimum of 8 river clam individuals. Eleven unmodified complete river clam valves are interpreted by Inomata as possible ink pots (Inomata et al. 2002) (Figure 8.18a–k). These are scattered through the structure, 1 appearing in the south room, 7 in the center room, and 3 in the north room. The clams also include 5 modified segments in the process of production, apparently into adornos (4 in the north room, 1 in the center), and 5 fragments of flat shell bead/disk/rings (mainly of nacre), suggesting the full range of shell working from raw material to finished products.

Vertebrate remains are significantly less diverse. The only reptiles are turtles, with hundreds of fragments representing a minimum of 3 individuals (but undoubtedly more, although there are not enough diagnostics to confirm this). All are from turtle shells, and only 2 of the fragments are not burned. These include 200+ fragments of Central American river turtle predominantly found in the north room, of which only 1 fragment is possibly a plastron segment, suggesting that only the carapace was normally used; 100+ fragments of slider turtles in the north and central rooms, all but 1 of which were again carapace; and a much smaller number of fragments of small mud/musk turtle found throughout the structure, representing both carapace and plastron (so likely at least 1 entire shell). Among the unidentified turtle shell remains was 1 artifact, a finished disk, found in the north addition (Figure 8.9k, 23A38-2-1, Cat. 1324-1). Birds were rare, including only 6 charred, unidentifiable, and unworked long bone fragments, all but the largest of which (from the south room) were found in the north room.

The mammalian remains were quite numerous here in comparison to other structures. Only a single small mammal long bone shaft was recovered, probably that of a rodent. Intermediate-sized mammals included the armadillo (only 3 scutes, all burned, all in the north room), a raccoon (1 charred, left, fused radius with its distal end cut and snapped and tossed as debitage, perhaps in the production of a small bone tube, found in the center room), 1 paca tooth (possibly recent), 1 agouti tooth (right, eroded), and 1 metatarsal (burned), all found in the north and south rooms. Dog remains were the most common, mostly found in the north room, but included only canines and other teeth (10 of which were modified to tooth beads and 5 of which are complete but unmodified). Most of the remains were burned (though only 3 of the modified ones, agouti, were burned). Therefore, all these intermediate mammal remains are either teeth or front limbs.

Large mammals are primarily cervids but also include remains from a jaguar and an unidentified large felid (likely the jaguar): a charred left humerus shaft and a metacarpal found in the north addition and a phalanx found in the center room. The white-tailed deer remains are numerous but represent a minimum of only 2 individuals. The remains include more than 250 antler fragments found predominantly in the north room (207), 6 segments of which were used as tools, possibly burnishers (found equally in the center and north rooms; see, for example, Figure 8.8e, 23A13-3-1, Cat. 1923-3), and 1 piece of debitage from tool manufacture (north room, Figure 8.9d, 23A32-3-1, Cat. 1483-1). With so many fragments, it seems that at least one full set of antlers must have been included. Most of these were burned (including 1 used segment), adding to the difficulty of seeing use-wear or cut marks.

Postcranial remains included 1 fused and charred scapula head from the north addition; 2 burned humerus segments (1 a fused left condyle, the other a shaft fragment probably part of the first) in the north room; 7 femur segments (5 from the north room), some with carving (including a complete carved shaft segment found in the center room, the others carved but with rough marks such as fossa plantaris and metaphyseal ends, suggesting the fragmented remains of a second complete carved bone, all burned); 8 fragments of tibia primarily from the north room (including most areas of the tibia, so probably representing 1 adult left element); 2 shaft segments as finished artifacts (Figure 8.8f', 23A17-3-1, Cat. 1156-2; Figure 8.9a, 23A32-3-1, Cat. 1993-5); 2 proximal fragments with scores (Figure 8.8o', 23A41-3-1, Cat. 1136-2), suggesting secondary reduction, and several distal remains including 2 complete right fibulae, both burned (center room); 1 unburned left tarsal (north addition), 3 metapodial fragments modified into a rasp (north room and north addition; see Figure 8.9c, 23A30-3-2, Cat. 1734-39); and 2 burned intermediate phalanges (1 from the north room, 1 from the north addition). One burned bone tube fragment and 2 unburned rasp segments suggest that either the femur or tibia was modified into a rasp, possibly with 1 smooth side (although none of these refit).

In contrast to the cervid collection, an assemblage of brocket cranial elements found in the north room includes 1 complete antler with perforations (Figure 8.3h, 23A44-3-1, Cat. 1303-1), suggesting its role as an adorno or costume element rather than a tool; 2 mandible segments, possibly both of a single right mandible; 3 mandibular molars/premolars (very worn, suggesting adult age); and another tooth, all found in the north addition. Nothing except the antler is burned. The apparently different use of the brocket from the white-tailed deer is difficult to interpret since the one suggests a head with skin (a costume) while the other suggests crafting with antler tools and deer long bone tools (secondarily reduced from long bone blanks, though the blanks were not themselves crafted in-house).

Not identifiable beyond mammal were some 430 additional fragments, including long bone and tibia shafts and carved innominate fragments (for example, Figure 8.5f, 23A46-3-1, Cat. 2104-5), encompassing finished artifacts (45), and debitage representing final-stage reduction or finishing of perforators (27) (for examples of reduction, see Figures 8.8n, 23A12-2-1, Cat. 317-1; 8.9j, 23A21-3-2, Cat. 1606-7; 8.9h, 23A30-3-2, Cat. 2092-4 [blank];

for finished artifacts, see Figures 8.10f', 22A17-3-3, Cat. 717-1; 8.8p, 23A28-3-2, Cat. 545-1; 8.1c, 23A42-3-2, Cat. 1839-38). Among these remains were several short bone plaques with one end rounded, the other end scored and/or snapped and not smoothed, all found in the south room. Inomata notes that the rounded ends were more severely burned and suggests that these worked bones were embedded in perishable materials on the unsmoothed ends and may have been part of the royal diadem crown (Emery and Aoyama 2007; Inomata et al. 2002) (see also Chapter 8, Figures 8.4f–i and 8.8o, s, t). Lithic evidence of hide working and perhaps skinning also provides excellent corroboration of bone and shell crafting in this structure (Emery and Aoyama 2007) (see Volume 2). The presence of spindle whorls points to an association with spinning (Inomata et al. 2002) (see Chapter 4).

Structure M8-8 (House of Axes): Operation 20A

The animal assemblage of this structure represents 13 percent of the site remains. These were primarily unweathered and had fairly high element completeness but were heavily burned. Very few of the remains exhibit butchering marks. Approximately half the remains were artifactually altered, but of those only 1 percent were crafting debitage, though 12 percent were unmodified remains of taxa often used as artifacts. Bone and shell remains were found predominantly in the north room or behind and to the south of the structure (see Figures 14.18 and 14.19 for distributions of the artifacts).

Again, the majority of the animal remains were from invertebrates, primarily from marine gastropods. These included 1 West Indian fighting conch artifact from the north room (Figures 8.13y, 20A19-3-1, Cat. 866-4; 8.20) and additional stromb fragments all modified to finished disks and adornos and found predominantly in the northern rooms (for example, see Figure 8.20z, 20A19-3-2, Cat. 959-2; 8.20d', 20A5-1-1, Cat. 121-1). Intermediate and small marine gastropods included a single cowry tinkler fragment (Figure 8.20f, 20A37-3-1, Cat. 1294-1) and fragments of a minimum of 74 individuals of reticulated olive and 4 individuals of lettered olive found throughout the structure. Among these fragments were 20 unmodified segments with no evidence of cutting, but that might represent the reduction of these larger lettered olive body whorls (north room; see Figure 8.20k', 20A19-3-5, Cat. 1029-13 for an example). An additional 60 unidentified olive individuals included at least 4 complete unmodified shells. Thirty-seven dwarf olives and 2 snowy dwarf olive complete shells, all modified, and 31 modified complete marginella were included in this assemblage of tinklers and probable tinklers. Other marine shells included a complete unmodified mitre shell from the north room and 2 fragmentary finished thorny oyster artifacts from the area in front of the north room. In comparison, the freshwater molluscs were very rare and included only a single unmodified apple snail fragment found in the south addition and 171 river clam fragments found throughout the structure that represented a minimum of 1 individual but probably more. Twenty-one of the river clam fragments had no obvious modifications, but the rest were artifacts, either finished or almost finished (one example found in front of the north room).

The vertebrates from this structure included several less-common taxa. A cichlid river fish head was represented by a burned left maxilla found in the south addition, and a burned lizard long bone shaft found in front of the north room was in poor condition, suggesting weathering before burning. The turtle assemblage was somewhat unusual in that it included none of the large Central American river turtles, but a complete mud or musk turtle carapace and plastron was found behind the center room, perforated on the marginal plates, charred but in excellent condition (Cat. 20A1345-7, Figure 8.10s, t). This perforated specimen could have been used as a drum, rattle, or adornment for a costume or as a curated medicinal or ritual item. An additional carapace plate from the same genus indicates the presence of at least 1 other individual, also charred, this one found in front of the north room. Also included among the turtle remains were slider turtle specimens representing at least 2 individuals, likely more. These included both carapace and plastron fragments, and so likely represented complete shells. These were found primarily in the northern and central rooms. No modifications were obvious, and only one fragment was unburned.

The small and intermediate mammals included several possible intrusives: 3 small unburned rodent incisors and an unburned long bone from a small rodent-sized mammal, as well as a single unburned opossum right mandible. More likely components of the original assemblage were a single unburned paca left maxillary molar and many armadillo scutes, all calcined and without any appendicular remains, suggestive of an armadillo shell bag or curated armadillo shell, all found behind and to the south of the structure. Some 60 probable dog remains representing at least 7 individuals and likely more were also recovered. Burned canines and fragments represented 29 teeth, at least 1 clearly unmodified and 16 modified by biconical perforations, found throughout the structure. In addition, 3 unmodified but burned mandibular fragments (likely all part of the same right mandible though not joined) were found behind the structure while 1 complete fused right metacarpal and 1 metapodial fragment, also both burned, were found in the north room. These indicate the use of more than just dog teeth. The presence of cranial elements, teeth, and foot bones is suggestive of a dog skin, perhaps with crania included. Two cat canines, both left (1 mandibular, 1 maxillary) and unburned, were found in the north room. The mandibular example was perforated while the maxillary one was not. A smaller cat maxillary canine, also not burned, is represented by the crown only. As the only long bone example, a margay distal right humerus fragment, charred and with skinning marks, was found behind the structure. An additional 11 cat/dog canines (representing at least 8 complete teeth, 6 of them perforated, 5 burned) and an unburned proximal phalanx add another 2 individuals to the total count but cannot be specifically identified. Together, this assemblage suggests the use of dog skins and teeth (perhaps in preparation), and possibly also cat skins and teeth, as indicated by the skinning marks on the humerus and the perforated and unperforated cat canines (and the possibility that the toes were also from cats).

Although all 3 artiodactyl taxa were found in the M8-8 assemblage, the only peccary element is an unburned immature tibia artifact (spatula) found behind the structure. Twenty-two white-tailed deer elements included 13 antler segments all found in the north room, 8 used as tools (possibly burnishers, all but 1 burned; for an example, see Figure 8.10e, 20A2-1-1, Cat. 101-1); 3 fragments of charred femur (Figure 8.10x, 20A6-2-2, Cat. 1041-3), including an eroded distal condyle and 2 worked shaft segments (1 a perforator) and 3 charred metapodial fragments (all finished awls; for example, Figure 8.10j', 22A8-3-3, Cat. 687-6), all found behind the structure; a burned left radius (rasp; Figure 8.4a, 20A38-3-3, Cat. 1333-2) and ulna (carved long bone; Figure 8.3l, 20A38-3-3, Cat. 1333-1) found in front of the south room; and 1 right fused calcaneum found in the north room. An additional 2 brocket deer antler fragments (neither modified though both burned) and 2 mandible fragments, possibly of the same left mandible (both burned), are suggestive of a single brocket cranium. All these remains were found behind and to the side of the structure. A final artifactually modified fragment of cervid antler found in the north addition indicates that at least some of the antler fragments may also have been crafted here or elsewhere (Figure 8.5g, 20A13-3-4, Cat. 859-1), while a piece of cervid metapodial shaft debitage found behind the structure (Figure 8.10d', 22A9-3-2, Cat. 742-2) suggests that the metapodial awls were occasionally manufactured near or in the structure. Large mammal long bone fragments include an additional 11 finished artifacts (rasps, tubes, perforators, spatulae) and 3 perforators in the process of final finishing (for example, Figure 8.10e', 22A17-3-4, Cat. 721-1), while the many unidentified mammal remains include 1 mandible and 1 innominate fragment but are predominantly long bone fragments representing 50 finished artifacts (tubes, perforators, spatulae, and possible blank/plaques) and 3 blanks or plaques in the process of secondary reduction or finishing (for example, Figure 8.10n', 22A16-3-2, Cat. 745-1).

The study by Emery and Aoyama (2007) in this structure identified lithic use-wear of cutting shell/bone and hide/skin that might be associated with secondary reduction and finishing of bone perforators, drilling of teeth and tinklers, and skinning animals and working the leather. The full assemblage supports the suggestion that the crafters of this household were involved in hide and textile production and decorating, and that bone perforators were secondarily finished here to suit the task at hand but were not created here from raw bone cores.

Structure M8-10 (House of the Scribe): Operation 14A

Very few remains were excavated from this structure during the first phase of the Aguateca Archaeology Project, and more were recovered during the earlier stage of investigation as part of the Petexbatun Project (reported in Emery 2010). To give a clearer perspective on the remains from this household, I include all materials excavated from this structure in this discussion, although they are not included in the overall chapter analysis since most were recovered earlier. The remains from this structure and the associated M8-13 are not evaluated in terms of distribution since these are covered in more detail elsewhere.

In combination, a total of 2,055 remains were recovered from this structure or the midden associated with both Structure M8-10 and the neighboring structure M8-13. A third of the specimens and most of the individuals were invertebrates. These were primarily marine molluscs, including strombs (2 Florida fighting conchs and 1 queen conch worked into a shell bowl) and other large gastropods, most of which were fragments of or complete finished shell artifacts, including an unmodified whelk and 3 shell paint pots of West Indian chank. However, the majority of the marine molluscs were finished tinklers, including a minimum of 15 individuals of reticulated olive, 37 of lettered olive, 5 of Pacific olive, and 292 of dwarf olive. Three fragments of thorny oyster were also recovered, all finished artifacts. The freshwater molluscs included at minimum 27 individuals of river clam recovered in a variety of stages of artifact manufacture, including almost complete valves smashed opposite the hinge for opening (17 specimens), discarded unworked hinge or worked but discarded hinge fragments (8 almost complete segments and 17 fragments), other nonhinge unfinished cut pieces (3), large rough "blanks" (2), and finished artifacts including 6 complete or almost complete perforated and polished valves, and 14 other adornments. This structure also contained the largest number of jute found at the site (82). All were unmodified, suggesting that if they were used as food, they were cooked without the traditional lopping of the spire that characterizes modern jute food remains (Healy et al. 1990; Keller 2008; Solis 2010). It is also possible that these were set aside or intentionally placed for some purpose other than food, and jute caches have been suggested at other sites (Halperin et al. 2001). Twelve fragments of apple snail likely represented the crushed remains of a single individual that may also have been intended as food, raw material for crafting, an adorno, or part of the jute cache.

Vertebrates included 3 fish bones, 1 from a fish head and the others undiagnostic. Reptiles, although dominated again by turtles, included 2 crocodile teeth, 1 perforated presumably for use as an adorno. The identified turtles are predominantly mud and musk turtles (most unclear as to shell), slider turtles (at least 4 individuals, all carapace fragments), and to a lesser degree Central American river turtles (over half the identified remains representing carapace, the others not identified). Almost all these remains were burned.

A fairly large assemblage of bird remains were recovered in this structure. Prominent among them were 4 turkey remains including an ulna and 3 leg bones, 6 unidentified bird remains including 5 limb bones (one of them an ulna), and an innominate. Together these represent a much higher diversity of body portions than is found for birds in any other structure, and a higher total number of bird remains than is found in most structures. One of the bird long bones was cut to a tube, suggesting that, again, we must consider the possibility that these remains, all of them of excellent size and shape for crafting, were perhaps intended for some purpose other than food.

The intermediate mammals include armadillo, represented in this assemblage by both scutes and a calcaneum, suggesting that the feet of the animal were retained with the carapace used here. Paca and agouti remains include 2 teeth, a left humerus, and a left radius, again more complete skeletal coverage than is found for these species in most structures. The dog remains include 11 canines (4 perforated) and a carnassial tooth, but also 2 radii (1 modified to an awl), an ulna, 2 tibiae, and a bacculum or penis bone with skinning marks at the proximal end (identified only as Carnivora). An additional 73 teeth (48 perforated) and fragments representing 43 individuals identified only as cat/dog are likely part of this assemblage and considerably increase the proportionate representation of teeth and individuals. Structure M8-10 also contained a fairly large proportion of cat remains. Large cat specimens include a metapodial (with butcher marks at the distal end), a phalanx identified as jaguar, and 2 carnassial teeth (1 perforated), an innominate, and another metapodial and phalanx identified only as large cat but likely belonging to the same individual. Intermediate cat remains included a carnassial tooth, a calcaneum, and a metapodial, while another metapodial was identified only as cat and may belong to either the large or the intermediate-sized individual. In combination, with the exception of the innominate segment, this predominantly teeth-and-toes assemblage suggests a skin rather than a complete carcass.

Large mammals beyond the jaguar include peccary elements representing a minimum of 2 individuals and including 5 teeth (2 perforated), a femur (left, adult), a probable tibia (modified to a bone tube), and 2 metapodials (1 from a juvenile). White-tailed deer elements represent a minimum of 7 individuals and include several axial elements (2 vertebrae, a weathered rib, and 5 weathered innominate fragments [3 rights]), which are underrepresented in other assemblages. Also included were an unburned right adult scapula and unburned juvenile left radius with butcher marks, 10 femur segments (all juvenile, 4 left and 3 right, none burned), 14 tibia segments (9 left, 4 right, 6 juvenile, and 2 adult, all burned), and 13 tarsals (3 lefts and 4 rights, 1 juvenile, 1 adult, 2 with skinning or butchering marks, 2 modified into adornments, and only 1 charred), 2 metapodials (1 juvenile, both burned), and 9 phalanges (3 charred, 4 weathered, 1 with skinning marks). This collection therefore represents fairly complete carcasses, except lacking cranial elements.

These remains also included three examples of debitage segments removed and discarded (a metapodial and 2 femurs; see, for example, Figure 8.6a, 14A2-4-1, Cat. 110-1). Two brocket deer individuals are represented by an antler, 3 humerus segments (both right, 1 juvenile), and 2 metapodial segments (1 right, 1 left, both juvenile and 1 weathered). Belonging to 1 of the 2 deer but identified only as cervid are a left juvenile radius and a left adult ulna, both unburned, and 3 metapodial fragments (1 juvenile, 2 charred, and including an example of secondary scoring debitage and a finished awl). Belonging to any of the three artiodactyl taxa are a rib, a femur, a tibia, and a phalanx. Further remains are identified only as mammals but are also likely part of the artiodactyl collection. These include femur fragments (most of which appear to be part of a single finished rasp, likely originally including the femoral head since that portion was present and polished), many tibia fragments (including 4 portions of a bone tube or shaft core suggested by scoring on 1 segment, a perforator or blank, an example of secondary scoring, and 2 rough awls), and a large collection of long bone fragments (including 32 examples of finished perforators, spatulae, paintbrushes, blanks, and awls along with fragments pertaining to the bone tube, a bone button, and a fishhook, and debitage primarily representing secondary reduction). The very high proportion of remains identified only to the level of unidentified vertebrates further emphasizes the fragmented nature of these remains in comparison to those from other structures.

Structure M8-13: Operation 14B

The animal remain assemblage from this structure is again small, representing only 3 percent of the site total, and it was also less diverse (only 17 taxa represented). The remains were neither heavily weathered nor burned, though the completeness ratio is low. Although only 19 percent of the remains were artifactually modified, almost a quarter of those were debitage from bone working, by far the highest proportion found in any structure. Confirming the findings of Emery and Aoyama (2007), this structure also has the largest proportion of debitage resulting from the first stage of artifact production. Possibly, the residents of this structure, or the co-residential group including Structure M8-10, were involved in the initial production of bone blanks that were further reduced in the locations of final use.

The assemblage from this structure is unusual in other ways as well. The proportion of freshwater molluscs found here, and particularly unbutchered river jute, is high in comparison to that found in other structures. The remains of at least 2 unmodified apple snails were also found (Figure 8.21u, 14B13-1-3, Cat. 155-7). River clam remains were abundant, with fragments from both hinge and marginal edge, indicating in situ butchering of the animals. Only one of these was an artifact (Figure 8.21f, 14B24-3-2, Cat. 896-1) and one was a debitage fragment (Figure 8.21q, 14B13-1-3, Cat. 155-18). In comparison, the marine shell remains were modest, including 2 stromb fragments and 1 large marine gastropod fragment, all modified to artifacts (Figures 8.13z, 14B1-3-2, Cat. 295-1; 8.21p, 14B13-1-3, Cat. 155-3), and tinkler fragments from 1 cowry individual (Figure 8.21m, 14B22-3-3, Cat. 914-1), 4 reticulated olives, and 2 lettered olives (Figure 8.21b, 14B1-1-2, Cat. 359-1). A single unmodified marine bivalve fragment was recovered (Figure 8.21s, 14B13-1-3, Cat. 155-17).

The vertebrate assemblage included a few fragments of Central American river turtle carapace (12 burned and none modified), and 1 fragment of slider turtle carapace costal plate, calcined, and modified to a bone plaque (Figure 8.11l, 14B14-2-1, Cat. 973-9). Birds were represented by a single unburned, left turkey tibiotarsus. A single dog radius (unburned but weathered) and 2 unmodified and unburned teeth were found, as were a cat canine (unburned) and another canine fragment that was identified only as cat/dog but likely comes from the cat tooth, and a cat phalanx (unburned and unmodified). None of the teeth of either cats or dogs was modified. Only one other intermediate mammal remain was recovered: the unmodified and unburned molar of an agouti.

Most of the identified mammalian remains were those of white-tailed deer, representing a minimum of 2 individuals but likely more. These included 2 humerus segments, one a burned bone shaft tube fragment or possibly shaft core fragment (Figure 8.11m, 14B30-3-2, Cat. 822-3), the other a fused unworked, unburned left distal portion; 2 scapula fragments, likely from the same left adult element; 2 ulnae, one an unburned right and one a charred left, neither worked; a proximal adult radius debitage segment; several femur fragments, including unburned distal and proximal working debitage from a juvenile left element and unburned distal working debitage from a left adult element, 2 perforator segments, and several unmodified fragments (a cervid femur shaft segment; possibly a bone tube or bone shaft core fragment also belongs with this assemblage); several tibia segments, including 4 juvenile right tibial crests, two of which are unburned debitage

(Figure 8.1i, 20A17-3-4, Cat. 721-1), 2 tibial crest awls (Figure 8.11n, 14B26-3-3, Cat. 953-2), and 1 spatulate tibia artifact; 1 juvenile unburned metapodial distal condyle debitage; and an unworked patella and unworked proximal phalanx, both also unburned. A brocket deer distal metapodial awl accompanies them and is charred (Figure 8.30, 14B2-3-3, Cat. 322-6). The awls are not well finished for the most part, which may be a function either of crafting in process or of the reduced effort expended on utilitarian artifacts. An additional large collection of large mammal and mammal long bone fragments includes 7 segments in production (for example, see Figure 8.6d, 14B13-1-3, Cat. 154-3; Figure 8.11t, 14B26-2-1, Cat. 667-5) and 20 fragments of finished artifacts, including another tube/core segment (Figure 8.4d, 14B28-3-1, Cat. 813-1), possible blanks or wide perforators or spatulae, perforator fragments, a disk, and a fishhook (Figure 8.4e, 14B26-3-3, Cat. 878-1). Most of these were burned.

This intriguing collection appears to include the full range of bone reduction for the production of perforators and possibly other artifacts. The bone tube segments have been recorded here and elsewhere as finished artifacts, but research on the Dos Pilas bone working assemblage clarifies that the first stage of bone reduction is often the creation and partial smoothing of a long bone core. These bone "tubes" might well represent bone cores. Moreover, the distinction between blanks, wide perforator shafts, and spatulae was not well defined in the Dos Pilas assemblage, suggesting that in many cases the artifacts we interpret as wide spatula shafts might actually be remains of the penultimate stage of perforator production, in which a wide blank is finished by smoothing and is then left for final modification into whatever version of perforator is needed by the consumer (Emery 2008, 2009). If these suggestions could be proved, the count of "debitage" in this assemblage would be much higher than it is currently represented, since it would include some of the remains now counted as "tubes" and "spatulae." The lack of butchering remains, or any other remains that suggest food consumption without crafting, indicates that these remains do not reflect food garbage but are instead the range of debitage abandoned during bone crafting at the last moments of residence in this structure.

Structures M8-2 and M8-3: Operation 23B

Remains from these structures represent 8 percent of the site total. None of these remains is weathered, and there is less evidence of burning than elsewhere, but the ratio of complete skeletal elements is very low, suggesting that the elements were highly fragmented in comparison to elsewhere. Very few of the remains were butchered or, overall, modified into artifacts (and many of these might have come from the palaces). However, of the artifacts, 15 percent were debitage, the second-highest proportion of these remains at the site, and 30 percent were unmodified artifact remains. The distribution of artifacts can be seen in Figures 14.26 and 14.29.

The assemblage includes several molluscs, primarily marine, all of which are either modified or unmodified individuals of such species as olives that are normally worked into tinklers (at least 20 unmodified individuals). The remains also included a large unmodified segment of a stromb aperture (Figure 8.21k', 23B13-3-4, Cat. 674-4) and another stromb segment cut but still in the process of finishing (both found to the side or back of M8-2), as well as a large unburned tulip shell segment cut into a rectangular segment but not yet smoothed (found in front of M8-2; Figure 8.21v, 23B23-2-1, Cat. 769-1) and at least 6 large olives in the process of further reduction to create rectangular plaques from the body whorl (found to the side or back of M8-2; for example, Figure 8.21c', 23B19-3-1, Cat. 487-24). These already had their spires removed and so might represent secondary use of curated tinklers, or perhaps the smaller were destined to become tinklers while the larger were to become plaques. River clam remains also showed evidence of working. These included 1 almost complete right valve fragmented opposite the hinge edge found in front of M8-3 (the common means of opening these clams while fresh); 1 large segment of a left valve, possibly of the very thin *Nephronaias* river clam, with cut marks suggesting production debitage (Figure 8.21l', 23B19-3-1, Cat. 690-1); and additional hinge, edge and nacre fragments, one of which had been modified to a disk bead and another that had perhaps had the periostracum removed by scraping (Figure 8.21m', 23B25-3-2, Cat. 515-1), all found to the side or back of M8-2. These combine to suggest river clam working at this site. An additional few freshwater apple snail specimens were recovered, but none was modified. Together these remains represent evidence for marine and river clam shell working, either at these structures or, if secondarily transported, from somewhere in the Palace Group structures. I favor the former argument, that the shell working was in situ, especially if the remains came primarily from behind the structure.

The vertebrates were dominated by turtle remains from both carapace and plastron. These included only 2 specimens of Central American river turtle carapace (inside M8-2) and more than 500 specimens of slider turtle found throughout the complex, including both plastron and carapace, indicating that the entire shell was used. All the turtle remains were charred or calcined and none was otherwise modified. The mammalian remains are quite limited in diversity, including, in addition to deer, only a single cat/dog maxillary canine root (right) that was charred and biconically perforated and a single peccary canine fragment that was also charred but not modified (both found to the side or back of M8-2), and a single unmodified, charred, left mandibular molar crown of an agouti (found in front of M8-3). The deer were represented by an interesting range of elements found throughout the complex. From white-tailed deer came an unmodified charred distal humerus segment, 2 charred metapodial shaft portions (both modified to perforators), 2 tibia fragments (one an unmodified and uncharred distal fused portion and the other a charred right tibial crest awl, possibly still in the process of finishing), 1 charred ulna shaft segment carved with semicircular patterns, and a possible portion of a bone tube. Two small but fused brocket deer metapodial distal condyles were found but were unmodified and uncharred. Other remains identified only as mammals were likely also part of the cervid assemblage and were all mammal long bone fragments, most of which were crafted into artifacts (11 fragments of perforators, 3 fragments of tubes, and 2 fragments of adornments) and most of which were burned. No debitage was recovered.

If the shell artifacts found behind Structure M8-2, with a large portion of exotic species, do not represent materials collapsed from the Palace Group, this building may not have been a low-status residence. The structure assemblage also does not include the typical range of "food" taxa and elements. However, the proportion of crafting debitage of shell (exotic marine shell in particular) and bone artifacts (of cervids) strongly supports the interpretation of a special-function crafting area. Lithic evidence indicated bone and shell working but also considerable meat or hide cutting (Emery and Aoyama 2007), which, without the bone evidence for butchering, might correlate best with hide preparation in association with bone perforator finishing and use, as well as shell adornment production (for textile decoration).

Structure M7-34 (House of Metates): Operation 21A

The animal assemblage from Structure M7-34 represents 2 percent of the total site remains. There is slightly higher than average weathering among the remains, but the burning rate is consistent with that of the other structures in the Causeway area and fairly evenly distributed among the taxa, suggesting that slightly different pre-abandonment distribution of animal remains resulted in the higher rate of weathering. Only a quarter of the remains were artifactually altered, but of those, 95 percent were finished and only 3 percent were debitage. Most of the remains were found in the front area of the structure and to the north side (76 + 51), somewhat fewer associated with the south room (19 in the front area and 20 in the room), and smaller proportions associated with the center room (all 27 in the inner area) and north room (6 in the front area, 13 in the room).

The molluscs were primarily marine and included 2 stromb body whorl segments crafted to finished artifacts from the north room and an additional 4 marine gastropod artifact segments possibly from similar artifacts (Figures 8.22e, 21A2-3-1, Cat. 366-1; 8.22i, 21A25-22, Cat. 461-2), as well as fragments representing 20 olive (for example, Figure 8.22j, 21A51-1-2, Cat. 863-1) and 14 marginella individuals (for example, Figure 8.22h, 21A25-2-2, Cat. 466-4), likely all part of finished tinklers. The smaller olives and marginellas were found predominantly in the back and to the sides, while the larger sayana olives were all found in the front area. A single thorny oyster valve segment from the center room was modified into a finished adorno (Figure 8.22g, 21A25-2-1, Cat. 1474-8). The only freshwater molluscs were the fragmentary remains of possibly a single river clam (with the hinge fragment present), none modified either for artifacts or otherwise and found throughout the structure (for example, Figure 8.16s, 22B55-3-2, Cat. 590-1).

The vertebrate assemblage includes 1 large bony fish body vertebra in the center room and the remains of at least 2 turtles—1 slider turtle (front area) and 1 Central American river turtle (north and center rooms)—most of which remains are charred or calcined. All the turtle remains are carapace, so it is possible that these carapace shells were vessels or artifacts, not food remains. The birds are represented by a single adult turkey left ulna shaft and 2 long bone shaft segments of an unknown but fairly large bird (possibly also a turkey from size alone) that have been modified into simple tubes (Figure 8.11n', 21A40-3-1, Cat. 587-19). All were found on the north side or in the back area. The mammal remains include the proximal and distal ends of an unfused, unmodified, left opossum femur from the center room; 9 unmodified specimens of a domestic dog, including 7 teeth (4 canine fragments, a left maxillary incisor, and 2 molars); and 2 charred fragments of a radius, most from the front area. An additional maxillary canine (right and unburned) and 5 charred tooth roots perforated into beads are likely also dog, although they could not be identified beyond cat/dog. An ocelot or margay left proximal ulna, heavily rodent-gnawed but not artifactually modified, is important given the use of cat ulnae at Piedras Negras as "chak scepters" (Houston, Escobedo, Child et al. 1998:47). This was found in the center room.

A single peccary is represented by a mandible fragment and left mandibular canine and molar, as well as four maxilla fragments and 2 right molars. None was burned or otherwise modified, but several were poorly preserved, suggesting surface weathering. All were found in the center room. Brocket deer elements found to the side and back included 2 unburned cranial fragments (one an adult portion of the right frontal that was cut and snapped, and the other a complete right antler and frontal on which the antler was cut from the parietal) and an almost complete adult right tibia. An unburned right cervid mandible without teeth, a poorly preserved left cuneiform, 2 proximal metapodial fragments (unburned, but one modified into a metapodial awl), and 2 artiodactyl phalanges (both carnivore gnawed, 1 browned) combine to reveal a pattern of cranial and distal element deposition for the artiodactyls. This is an unlikely distribution for food consumption (particularly considering the lack of white-tailed deer, ubiquitous otherwise) and could instead suggest elements contained within skins and/or the use of antlers and metapodials as tools. The lack of butchered remains and the suggestion of deer skins indicates that the meat/hide lithic use-wear reported by Aoyama likely pertains to hide working (Aoyama 2007a; Emery and Aoyama 2007).

Structures M7-91 and M7-92: Operation 21A

The animal assemblage from Structures M7-91 and M7-92 is very small, representing 9 individuals and 8 taxa. This is too few to justify a structure distribution analysis. The remains included 19 marine mollusc specimens: a charred marine gastropod artifact, 14 small stromb beads and a stromb disk (Figure 8.220. 21A72-3-2, Cat. 1086-1), 2 tinklers of lettered olive, and 3 river clam nacre fragments. Vertebrates were represented by 2 burned turtle shell fragments (unmodified); 1 unmodified, unburned left coati maxillary molar; 5 dog canines and a carnassial (none modified as artifacts but all burned), and a dog ulna (unburned but weathered); 1 paca unburned humerus with carnivore gnawing; and 1 complete adult cranium and mandible of a big-eared climbing rat, unburned and possibly intrusive. Additionally, there was 1 fragment of an unburned intermediate mammal long bone (with cut marks from butchering), 5 fragments of burned mammalian long bone (2 with cut marks), and 1 rib fragment. One of the long bones was a perforator fragment. In total, just over half the remains were artifactually altered (although 24 percent of those were unmodified dog teeth), and none were debitage remains. Almost 7 percent of the assemblage showed evidence of butchering, all mammalian long bones, one of which was an intermediate mammal, suggesting that the animals butchered were dogs or agoutis.

Overall weathering of this assemblage is fairly high but the burning rate is low, indicating that these remains were exposed to the elements longer than were the remains from other assemblages but that the structures were not as affected as other locations by the site abandonment burning event. The overall high weathering and specific weathering on the dog ulna and agouti humerus might indicate food garbage left out (though these are not portions usually consumed), but the large proportion of finished artifacts and nonfood portions (e.g., turtle plastron, teeth, and worked bone) does not otherwise resemble typical domestic food garbage. Since the only artifacts that were burned were those of tooth or bone and 1 shell artifact, it is possible that these were burned separately before the abandonment of the site.

One hypothesis for the function of Structure M7-34 and perhaps the associated small structures, given the metates and lithic evidence for meat/hide cutting (Emery and Aoyama 2007), is that they were used for communal gatherings and possibly feasting. If so, meat might have been prepared in these two small structures rather than in Structure M7-34 itself, since they have a larger-than-usual proportion of butchered remains. However, it is also possible that these specimens represent the preparation of the pelts and teeth, as found elsewhere at the site (instead of or in addition to other uses of the carcass). The high proportion of shell artifacts in Structure M7-34 compared with Structures M7-91 and M7-92, including tinklers, marine shell disks and adornments, and thorny oyster, as well as the paucity of normal food species and food portions in all three structures, suggests nonfood-related activities. This is emphasized by the fact that the Structure M7-34 assemblage had (and Structures M7-91 and M7-92 did not have) perforated dog teeth, cat ulna, and peccary and brocket deer heads and feet, suggesting the use of skins in Structure

M7-34; moreover, the several bone perforators and possible spatulae in Structure M7-34 suggest crafting of some sort (though not bone or shell crafting since debitage is almost completely lacking from any of these structures).

Granada Group (Structures K8-27, L8-70, and L8-62): Operations 26A and 27A

The Granada Group was an elite residential area located to the west of the Main Plaza. Its faunal assemblage was recovered from two test pit excavations in Structure K8-27 (providing only 3 total specimens) and in middens behind Structures L8-62 and L8-70 (providing the remaining 566 specimens). The remains therefore predominantly represent more traditional assemblages of slowly accumulating discarded materials, not the rapidly abandoned, in situ remains of activities in progress. They are therefore an interesting comparative assemblage but difficult to equate to those of the rapidly abandoned structures.

This small assemblage (6 percent of the site assemblage) is fairly diverse for its sample size. In addition, the taxonomic coverage is quite different from that of other structures since there is much less emphasis on large mammals and much more on nonmammals and small and intermediate mammals. The remains are not weathered, but the elements are highly fragmented and, most interestingly, have the highest rate of burning at the site. This high burn rate, even in comparison to that of the burned structures, likely represents the significant effects of burning midden garbage. Less than 1 percent of the remains are artifactually altered, and all are finished artifacts. With the exception of a single marine gastropod shell bead, all are bone, including a bone tube and 2 perforators.

The vertebrate assemblage includes far more fish than is found at any other location at the site. Ten precaudal and 2 caudal vertebrae, all burned, are part of either a cichlid fish represented by a thoracic vertebra and a charred right maxilla or a freshwater catfish represented by two pectoral spines, one charred (this is the only location where catfish remains are found), or both. Among the reptile remains are a charred tail vertebra from a large nonboid snake and an uncharred dermal scute of a crocodile. The turtles are represented by a few charred carapace plates from a Central American river turtle, 4 burned carapace plates of small mud and musk turtles, 9 of large musk turtles, and 2 of slider turtles. Together these represent 3 individuals, 1 of each species. The unidentified turtle remains are primarily carapace plates but also include a significant number of plastron plates and most importantly a rib and a vertebral arch, appendicular items missing from any other assemblages (although these could also have originally been attached to the carapace). This is also the only assemblage containing the large musk turtle.

Nonreptilian remains include 2 small bird long bone shaft fragments (1 burned) and several small mammals, represented by a complete left adult squirrel humerus (the only example at the site), an uncharred and likely intrusive big-eared climbing rat femur, and a rabbit or opossum-sized thoracic vertebra (burned). Intermediate-sized mammal remains include a burned armadillo scute; a paca molar and fragments of possibly a single ulna, five phalanges, and a scapula from the same species, all burned; and an agouti represented by the burned distal condyle of a femur. Dog specimens include an uncharred left astragalus and 3 metapodials (1 uncharred). A small cat terminal phalanx is charred. Various intermediate-sized mammal long bone fragments, ribs, and vertebrae (all burned, 1 rib and a long bone with cut marks from butchering) are likely all part of either the dog or cat individuals, based on their sizes. The only large mammal remains that are found in this assemblage are a single burned cervid metapodial and the distal fragment of an artiodactyl tibia, also burned. A mammalian humerus (2 distal epiphyses), a cranial fragment, and several long bone fragments are all burned. Two further long bone fragments are butchered, while 3 long bones were modified, 1 to a tube and 2 to perforators. A final 155 unidentifiable vertebrate elements, all but one charred, are indicative of the high proportion of fragmentation in this assemblage since these are proportionately higher here than elsewhere on the site.

Overall, although small, this assemblage presents a very different distribution than the other remains from the site: it represents a higher proportion of small/intermediate to large mammals, a high rate of nonmammalian vertebrates, and almost no invertebrates.

Barranca Escondida: Operation 24

The Barranca Escondida animal assemblage includes just over 1 percent of the specimens from the site, though it is fairly diverse. The assemblage is the most weathered of all those examined here, but it is one of the least affected by burning. This is perhaps not surprising for the location since it is open to the elements and also isolated from the burning of the site. The assemblage also has one of the highest rates of butchering at the site, but the butchering evidence is found entirely on a single jaguar individual. All are skinning and disarticulation marks reflective of the reduction of this individual to a carcass and skin. In contrast, the assemblage includes only a very small proportion of the artifacts of the site.

The most common taxa by MNI were freshwater molluscs, including 1 jute with its spire chopped off and calcification over the entire surface, suggesting that it was originally from a cave deposit or the like, and 1 complete unmodified apple snail shell. Only 4 marine molluscan individuals were found, including an eroded juvenile Florida fighting conch body whorl fragment (with evidence of erosion that is possibly predepositional, suggesting a curated artifact or a beach-worn specimen); a carved stromb body whorl fragment (Figure 8.12a', 24A0-0-0, Cat. 161-2); the base of a lettered olive, probably from a worked tinkler although no working was visible on this fragment; and 3 small marine gastropod shell beads, 2 of which were charred. A single marine bivalve segment was found: the complete, unworked, right valve of a mossy ark. A cane toad mandible segment is likely intrusive, but the lone turtle specimen is a carapace plate segment modified into a biconically perforated disk (Figure 8.4l, 24A14-1-1, Cat. 181-1). The birds are represented by an intermediate-sized bird right tibiotarsus proximal end. This may also be intrusive since its unformed terminal ends indicate it was a juvenile. An adult opossum mandible (horizontal ramus, left) was highly weathered. A calcaneum from a juvenile dog was also very eroded and poorly preserved, likely as a result of the juvenile nature of the bone.

The most intriguing materials were 67 specimens all likely pertaining to a single adult jaguar individual. The elements included the ascending and horizontal ramus of both sides of the mandible (no teeth) with skinning marks on at least 1 fragment; at least 2 cervical, 2 thoracic, and 1 lumbar vertebrae; ribs; an innominate; a right humerus; 1 almost complete right ulna; shafts from the right and left femur and tibia; metapodials from front, back, and both sides (2 with extensive skinning marks); a right calcaneum; and an intermediate phalanx. Additional unidentified mammalian remains might also pertain to this almost complete skeleton. Most of these remains are both carnivore- and rodent-gnawed and highly weathered, indicating that the remains had been left exposed for some time. Skinning marks on the mandible and metapodials and the lack of cranium or any distal phalanges strongly suggest that the carcass was skinned. The missing teeth may have been removed during butchering, although the remains were too eroded to show signs of extraction. Whether the cat was also part of a ritual is impossible to know since there are no other indications of sacrifice or burning. Lithics from the area had considerable evidence for cutting meat and hide (Emery and Aoyama 2007) (see Volume 2).

In contrast to the large number of jaguar specimens, the Barranca assemblage includes only 1 unmodified white-tailed deer femur fragment, 1 paca proximal femur, and 2 agouti mandibular teeth. Specimens of a minimum of 2 murid rodent individuals were also recovered, including 1 juvenile unfused vertebra and 1 mature individual represented by ribs, a scapula, and a thoracic vertebra. One cranium fragment may have belonged to either individual.

Although several of these specimens may have been intrusive (particularly the murid rodents) or dietary trash (the jute), it should be emphasized that many are modified artifacts, unusual specimens (the jute is calcified, the jaguar complete and skinned), cranial elements (the toad, the opossum, the paca), or young individuals (the dog and the bird), suggesting an alternate role for these remains and that they may instead have also been part of this unusual ritual assemblage.

TAXONOMIC DISTRIBUTIONS

The structure-specific distributions of taxa and elements make it clear that most of the Aguateca remains recovered from the rapidly abandoned structures are not the simple remains of food or other garbage. They include unusual suites of animals and unusual skeletal distributions with unusual artifactual and other modifications. In this light, it is important to understand what possible role their distribution might represent. The following review of the taxonomic groups explores the various roles of the dominant taxa of the Aguateca assemblage.

Invertebrates

Invertebrates represent half of the Aguateca NISP and 90 percent of the MNI (Table 9.4). Most specimens are marine shell, found in all but one of the structures. The dominant group is the gastropods, primarily the small olives found in 10 of the 12 structures, although these represent only 5 of the total 30 marine taxa. Also ubiquitous are the strombs, though these represent a much smaller proportion of the molluscan individuals. The invertebrate shell diversity was high and included many species originating from the Caribbean and southern Mexican Gulf coasts (they are simply called Caribbean shells herein). Two shell taxa are from the Pacific (Pacific olive and Mexican giant limpet), and another 2 taxa (trivia and harp snail) are identified as being from the Pacific, although with some hesitation because other, similar species within the genus are found in the Caribbean and the Gulf Coast. Pacific olive remains are found only in the termination deposits of the Palace Group and M8-10, and no Pacific shells or possible Pacific shells are found in any but the most elite structures. The Pacific olive has been reported in elite deposits at other sites and is seen carved on the skirts of rulers at sites such as Copan and Quirigua (Andrews 1969). The Pacific limpet is also found in elite structures elsewhere, and the largest specimens were likely used as pectorals (for example, in the Copan acropolis; see Bell 2007).

As discussed in Chapter 8, most of the invertebrate remains were modified into artifacts and all were likely used as adornments or ceremonial objects since their procurement would have been costly. One question is whether these marine molluscs were modified at the site of Aguateca from complete imported shells or whether the finished artifacts were imported to the site from another source. It is likely that both answers are correct, but there is considerable evidence for the modification of strombs (finishing in Structure M7-32, full range of reduction in Structure M8-4), olives (possible secondary reduction of large olives in Structures M8-2 and M8-3, and some evidence for secondary reduction and drilling in Structure M8-8 and the M7-22 termination deposits), and the Pacific olive in particular (in the M7-32 termination deposits). Unmodified shells of both large and small gastropods, as well as a possible thorny oyster valve (Structure M8-4), were found in various locales, suggesting that complete shells were brought into the site for working.

The freshwater shells are fairly rare by comparison, which is surprising given the location of Aguateca on the shore of a river. They include the 2 common freshwater gastropods (the jute and apple snail) and the common river clam. These species are somewhat controversial in terms of their role as either food or nonfood, or perhaps both. The jute and apple snail are today, and were in the past, a favored food (Emery 1986; Healy et al. 1990). However, apple snail shells with carefully cut perforations apparently for hanging or attachment have been found at Aguateca (2 of the 12 individuals) and elsewhere (for example, at Tamarindito; Emery 2010:236), though always in small numbers. And jute are often found in massive numbers at other sites in ball courts and caches (such as at Pacbitun, Belize) and also in cave sites, another ceremonial location (Halperin et al. 2001). Jute are rare at Aguateca and were found primarily in Structures M8-10 and M8-13. There they were not "lopped," as is the norm for cooking, suggesting that they may not have been simple food detritus. However, they were not artifacts used by the Aguateca elite for adornment or status enhancement, so perhaps an interpretation of cached material is appropriate. The same cannot be said for the river clams, whose pearly nacre is often found modified into a range of attractive artifacts at Maya sites (Powis 2004). Their remains are found in all stages of crafting at Aguateca (specifically in Structures M8-10, M8-13 [possibly only butchering], M8-2, M8-3, and M8-4 and the M7-22 termination deposits), so we can assume that they were used wherever possible in creating adornments. Were they also a subsistence resource? It seems highly likely, but the separation of these remains into food and nonfood would be well nigh impossible since they were likely harvested, eaten, reduced, and worn in different locations and by different residents. At the site of Motul de San José, evidence for river clam crafting was abundant in the residences of the elite non-nobles, but in the residences of the kings themselves the evidence was primarily of finished artifacts (Emery 2012).

Fish

Very few fish remains were recovered from Aguateca, including only a cichlid head in Structure M8-8, body remains in the termination deposits, and head and body remains in the Granada Group (Table 9.5). The lack of fish is surprising given their use as food, their ready accessibility, and their symbolic role for the ancient Maya as actors in the Popol Vuh, linked to God I, symbol of regeneration, and elite wealth and perhaps control over aquatic ecosystems (Kerr 2011; Milbrath 1999:205; Puleston 1977; Taube 1992b:24). But this pattern is seen at most Maya sites. The sparseness has been attributed to lack of use (very unlikely), poor preservation (Stanchly 2004; Szpak 2011), inadequate recovery methods (Quitmyer 2004), and differential discard. At Aguateca, recovery methods should not have affected the recovery of fish or other small remains since excavation included screening and detailed small-find recording. Preservation does not seem to be the culprit because the remains are predominantly unweathered and complete elements are burned to no greater extent than other remains at the site. The most likely answer lies in the effects of preparation and discard, particularly since it is unlikely that we are seeing simple food remains in and very close to the structures. Ethnographic studies show that fish garbage is burned to ash and/or discarded at great distances from houses (Emery and Brown n. d.).

At Aguateca, the only fish identified were common riverine cichlids and freshwater catfish (found only as spines and only in Granada). Other species undoubtedly exist in the unidentified portion, but comparative materials were not available for use in identification. The cichlids are primarily represented by cranial portions, but only body portions are found in the Palace Group deposits and in Structure M7-34 whereas only cranial portions are found in Structures M8-8 and M8-10. While in combination the finds indicate that fishes like cichlids were procured locally, butchered on site, and used in their entirety, the distribution suggests that different structure residents used the fish in different ways. Catfish, for example, is a favored food, but archaeological remains in burials at other sites suggest that their sharp and durable spines may have taken the same role as stingray spines and might easily have been used for perforating skin or leather (Emery 2007a:57).

Amphibians and Reptiles

Very few amphibians or nonturtle reptile taxa were found, perhaps as a result of preservation or recovery (except that again, none were weathered and all were fairly complete), or because the few that were found were intrusive. If so, it is clear that at least one of the frogs and the lizard intruded before the burning event because their remains are burned. A single crocodile dermal scute was identified in the Granada Group, and 2 teeth in the Structure M8-10 assemblage, as were snake vertebrae in the Palace Group termination deposits and the Granada Group. Snakes could also be intrusive (although at least 1 vertebra is burned), but it is surprising that more crocodile remains are not found here or elsewhere. Crocodile remains are often found in elite or symbolic contexts: at Motul de San José (Emery 2012), Sierra Lacandon (Sharpe 2011), Laguna de On (Masson 1999a), Lamanai (Stanchly 2007), and elsewhere. They were symbolically associated with Xibalba and also the Earth Monster (Pohl 1983:81; Thurston 2010). For an evaluation, see Thurston (2010). If the animal was as common as it is today and was used for food and skins, we would expect to find more of its robust skeleton.

The reptiles were dominated by the freshwater turtles, primarily slider turtles and Central American river turtles. Although turtles were highly ubiquitous, almost no turtle remains were found in the Palace Group deposits, in those of Structures M7-91 and M7-92, or the Barranca Escondida. The large Central American river turtle is considered a preferred food animal today, and some researchers have suggested that it was an elite food (Pohl 1985; Teeter 2004), but others have found that the frequency of these species does not correlate well with social status at all sites (Gotz 2008; Sharpe 2011; van der Merwe et al. 2000). At Aguateca, Central American river turtles were found in the high-status Structures M8-4 and M8-10 and in the Granada Group, though not in Structure M8-8. However, they were also found in the special-function Structure M7-34 and lower-status Structure M8-13, while small mud and musk turtles, or "poor man's food," were found in all the top-ranking residences.

The Aguateca turtles are represented by carapace and plastron segments but not appendicular or body elements (Table 9.6). This might be due to differential discard of appendicular remains since, at least in the Peten, these are considered unsafe for dogs and are discarded at a distance (Emery and Brown n. d.). However, the carapace and plastron remains might suggest use of the shells only rather than discard of food remains. Carapace fragments are also significantly more common than plastron fragments, particularly among Central American river turtles (overall the Central American river turtle is 93 percent carapace, whereas the slider turtle is only 43 percent carapace and 51 percent plastron, and musk turtle is 41 percent carapace, 13 percent plastron). Today the large Central American river turtle and large musk turtle shells are used as containers to hold dried maize kernels and other products, and the shells are curated for medicinal uses (Emery 2011). The smaller musk turtle has also been suggested as a medicinal species (Carr 1991) and is often used as a rattle since, as with a box turtle, the plastron is hinged to seal completely to protect the animal. All three turtles could have been used as drums, as turtles are often depicted as such in iconography (Healy 1988). We would expect to find both carapace and plastron if the animal shell was being used as a rattle or drum (slider turtles in Structures M8-8, M8-2, and M8-3; small mud and musk turtles in Structure M8-4), but perhaps only the carapace if it was being used as a storage or serving vessel or being cached for an alternative reason (Central American River turtles everywhere, large musk turtles in the Granada Group). The complete and perforated small musk turtle shell recovered from Structure M8-4 is an excellent example of an alternative use, though it might be difficult to discern whether it was used as a rattle/drum, simply for decoration, or for its symbolic links to, for example, the watery underworld and the earth.

The proportion of burned turtle remains is far higher than the norm for the site as a whole (89 percent of Central American river turtle, 97 percent of small mud and musk turtles, 100 percent of large musk turtles, 98 percent of slider turtles), suggesting that these shells were burned before the abandonment of the site—perhaps as vessels over a fire or perhaps smoked inside the houses as medicinally cured carapaces are today (Emery 2011).

Birds

Bird remains are also very rare at Aguateca, as they are at most Maya sites. It is likely that these fairly fragile remains do not preserve well in comparison to the more robust reptiles and mammals, although only one Aguateca specimen was found to be highly eroded. When these are recovered, even the larger species are difficult to identify since the diagnostic characters are the first to be damaged. This is unfortunate because many of them were undoubtedly used as food, medicine, symbols, and a source of feathers, skins, and bone (Benson 1989, 1997; Corona-M. 1997; Emery 2010:61–62; Pohl 1983). The Aguateca assemblage includes a single parrot bone (wing) in the Structure M7-32 termination deposits and several turkey remains (wing and leg) in Structures M8-10, M8-13, and M7-34. The parrot wing was possibly the remains of a ceremonial or decorative item, possibly still with skin and feathers since it was unburned. The turkey wing bone found in Structure M7-34 may also not have been food remains, but the remains from Structure M8-10 represent all body portions except the head and could have been a fairly complete, discarded, or abandoned carcass since it was weathered. However, the carcass could have been discarded after meat consumption or after feather removal for decoration, or with plans for reduction of the long bones into artifacts such as the bird bone tubes found in Structure M7-34. Unfortunately, too few remains of these birds were recovered for us to really assess their function or distribution.

Mammals

At Aguateca, and elsewhere in the Maya realm, mammals dominate the vertebrates particularly in terms of individuals (because turtles have multiple parts, they often dominate numerically). Their dominance is clear in most of the structures. These were primarily large and intermediate-sized mammals (including artiodactyls and large cats, opossums, armadillos, agouti/paca, dogs, and intermediate-sized cats).

Dogs

The dominant intermediate mammals are the dogs. Dogs are ubiquitous in Maya sites, and archaeological, zooarchaeological, iconographic, and ethnographic research indicates their ancient use both as a steady source of meat for many communities (Clutton-Brock and Hammond 1994; Wing 1978) and as an important component of ritual (Pohl and Feldman 1982; Shaw 1991, 1999). Dogs were also used for medicine, tribute payment, hunting, and companionship, and after death their bones and teeth were used as ritual objects and for personal adornment (Clutton-Brock and Hammond 1994:825; Hamblin 1984: 114). (For an excellent review of dog symbolism and distribution, see Valadez et al. 2013.) The category of "dogs" in the Aguateca analysis includes those identified strictly as dog and those identified only as canids. Canids can include coyotes, though these have never been securely identified for the region (Hidalgo-Mihart et al. 2004), so can likely be excluded.

Dog remains are found in all but one location, Structures M8-2 and M8-3. They are most common in the Structure M7-32 termination deposits and in Structures M7-91 and M7-92. Over 90 percent of the dog remains are cranial, most of those canines. This is particularly the case in the Palace Group termination deposits, where they are 94 percent of MNE. The remaining specimens are distal elements, those of the lower front limb and a single bacculum in Structure M8-10. This is far from the distribution of a food carcass and is better explained by the use of the dog for tooth bead adornments (in total over 85 artifact segments representing 63 finished tooth beads and 24 unmodified teeth likely part of adornment complexes) and possibly the use of dog hides, including both mandible/teeth and paws (distal and lower limb elements). The use of hides with both skull and feet is suggested in the M7-22 termination deposits and in Structure M8-8 (also possibly at Structures M7-34, M7-91, M7-92, M8-10, and M8-13, where lower limbs and teeth are found), whereas only feet are found in the Barranca and Granada deposits. Slightly more than half the canines, carnassials, mandibles, and distals were left elements, suggesting the possibility of a side-favored use of the dog elements (see Table 9.7 for information on side and age distributions). Among the left elements are all of those found in the Barranca Escondida (feet), Granada Group (feet), and Structure M7-34 (teeth and lower limb), and three-quarters of those in the Palace easternmost room remains (teeth). However, the sample is too small to do more than hint at the possibility of left-focused element use. Interestingly, almost three-quarters of the canines identified only to cat/dog were also left elements, although these were not included in the dog analysis. Only 2 of the minimum of 12 individuals for which age could be calculated were juvenile, and

TABLE 9.6. Percentage of Identified Elements and Body Portions Found for Select Taxa in the Structure Assemblages.

			PALACE GROUP					
			22B: M7-32 PALACE (TERMINATION)		22A: M7-22 PALACE (TERMINATION)		22A: M7-22 PALACE (EASTERNMOST ROOM)	
TAXON	BODY PORTION	ELEMENT	%N	%E	%N	%E	%N	%E
Canis lupus familiaris	cranial	teeth	94.55	91.18	97.06	94.12	100	100
		mandible	1.82	2.94				
	lower front limb	radius	1.82	2.94				
	distal	metapodial	1.82	2.94				
		phalanx			2.94	5.88		
Small/Intermediate Cats	cranial	teeth	100	100	66.67	50.00		
	upper front limb	humerus			33.33	50.00		
Large Cats	upper front limb	humerus			70.00	50.00		
	lower hind limb	tibia			30.00	50.00		
Tayassuidae	cranial	cranium	75	50				
	upper hind limb	femur					100	100
	lower hind limb	fibula	25	50				
Odocoileus virginianus	upper front limb	humerus	10.53	11.11	28.89	25		
	lower front limb	ulna/radius			2.22	12.50		
	upper hind limb	femur	63.16	66.67	46.67	50.00	100	100
	lower hind limb	tibia	10.53	11.11	22.22	12.50		
	distal	carpal/tarsals	5.26	11.11				
Mazama sp.	upper hind limb	femur			100	100		

			CAUSEWAY AREA												
			23A: M8-4 (MIRRORS)		20A: M8-8 (AXES)		14A: M8-10 (SCRIBE)*	14B: M8-13		23B: M8-2/3		21A: M7-91/92		21A: M7-34 (METATES)	
TAXON	BODY PORTION	ELEMENT	%N	%E	%N	%E	%N	%N	%E	%N	%E	%N	%E	%N	%E
Canis lupus familiaris	cranial	teeth	100	100	91.67	81.25	70.59	66.67	66.67			85.71	85.11	77.78	87.50
		mandible			5.00	6.25									
	lower front limb	ulna/radius					17.65	33.33	33.33			14.29	14.29	22.22	12.50
	lower hind limb	tibia					11.76								
	distal	metapodial			3.33	12.50									
		phalanx													
Small/Intermediate Cats	cranial	teeth			50	50	33.33								

	upper front limb	humerus			50	50									
	lower front limb	ulna												100	100
	distal	phalanx					66.67								
Large Cats	cranial	not teeth					20.00								
	upper front limb	humerus	33.33	33.33											
	upper hind limb						20.00								
	distal	phalanx	66.67	66.67			60.00								
Tayassuidae	cranial	mandible												11.11	16.67
		mandibular teeth					22.22							22.22	33.33
		maxilla												44.44	16.67
		maxillary teeth					11.11							22.22	33.33
		teeth					22.22			100	100				
	upper hind limb	femur					11.11								
	lower hind limb	tibia			100	100	11.11								
	distal	metapodial					22.22								
Odocoileus virginianus	cranial	antler	91.03	9.09	59.09	11.11									
	axial	vertebra					5.56								
	upper front limb	scapula	0.34	9.09			1.85	6.25	6.25						
		humerus	0.69	9.09				6.25	11.11	16.67	20				
	lower front limb	radius/ulna			9.09	22.22	1.85	9.38	16.67	16.67	20				
	upper hind limb	innominate					9.26								
		femur	2.41	9.09	13.64	33.33	18.52	31.25	11.11						
	lower hind limb	tibia	2.76	9.09			25.93	21.88	22.22	33.33	40				
		fibula	0.69	18.18											
	distal	carpal/tarsals	0.34	9.09	4.55	11.11	16.67	9.38	11.11						
		metapodial	1.03	9.09	13.64	22.22	3.70	6.25	11.11	33.33	20				
		phalanx	0.69	18.18			16.67	6.25	5.56						
Mazama sp.	cranial	frontal + antler	14.29	25	50	50	16.67							66.67	66.67
		mandible	28.57	25	50	50									
		teeth	57.14	50											
	upper front limb	humerus					50								
	lower hind limb	tibia												33.33	33.33
	distal	metapodial					33.33	100	100	100	100				
Agouti/Paca	cranial	tooth	66.67	66.67	100	100	50	100	100	100	100				
	upper front limb	humerus					50					100	100		
	distal	metatarsal	33.33	33.33											

Table 9.6. (cont'd.) Percentage of Identified Elements and Body Portions Found for Select Taxa in the Structure Assemblages.

Taxon	Body Portion	Element	Barranca		Granada		Totals[a]	
			24A		26A&B, 27A			
			%N	%E	%N	%E	%N	%E
Canis lupus familiaris	cranial	teeth					91.79	85.54
		mandible					1.74	1.96
	lower front limb	ulna/radius					2.16	3.85
	lower hind limb	tibia					*	*
	distal	carpal/tarsals	100.00	100.00	20.00	25.00	0.43	0.96
		metapodial			80.00	75.00	3.02	5.77
		phalanx					0.43	0.96
Small/Intermediate Cats	cranial	teeth					60.00	55.56
	upper front limb	humerus					20.00	22.22
	lower front limb	ulna					10.00	11.11
	distal	phalanx			100.00	100.00	10.00	11.11
Large Cats	cranial	L&R mandible (no teeth)	7.58	8.00			6.58	6.90
	axial	vertebra	50.00	28.00			43.42	24.14
	upper front limb	humerus	3.03	4.00			13.16	13.79
	lower front limb	ulna	1.52	4.00			1.32	3.45
	upper hind limb	innominate	1.52	4.00			1.32	3.45
		femur	3.03	8.00			2.63	6.90
	lower hind limb	tibia	4.55	12.00			5.26	13.79
	distal	various	12.12	32.00			11.85	27.59
Tayassuidae	cranial	cranium					17.65	9.09
		mandible					5.88	9.09
		mandibular teeth					11.76	18.18
		maxilla					23.53	9.09
		maxillary teeth					11.76	18.18
		teeth					5.88	9.09
	upper hind limb	femur					11.76	9.09
	lower hind limb	tibia					5.88	9.09
		fibula					5.88	9.09
	distal	metapodial					*	*
Odocoileus virginianus	cranial	antler					61.42	2.94
	axial	vertebra					*	*
	upper front limb	scapula					0.67	2.94
		humerus					4.43	10.29
	lower front limb	radius/ulna					1.55	10.29

	upper hind limb	innominate					*	*
		femur	100.00	100.00			19.73	33.82
	lower hind limb	tibia					6.43	13.24
		fibula					0.44	2.97
	distal	carpal/tarsals					*	*
		metapodial			100.00	100.00	2.44	10.29
		phalanx					0.89	4.41
Mazama sp.	cranial	frontal					5.56	8.33
		frontal + antler					5.56	8.33
		antler					16.67	16.67
		mandible					22.22	16.67
		teeth					22.22	16.67
	upper front limb	humerus					*	*
	upper hind limb	femur					5.56	8.33
	lower hind limb	tibia					5.56	8.33
	distal	metapodial					16.67	16.67
Agouti/Paca	cranial	tooth	66.67	66.67	9.09	11.11	38.10	42.11
	upper front limb	humerus			9.09	11.11	9.52	10.53
	lower front limb	ulna			27.27	11.11	14.29	5.26
	upper hind limb	femur	33.33	33.33	9.09	11.11	9.52	10.53
	distal	phalanx			45.45	55.56	28.57	31.58

Note: All values are percentages of taxon NISP (N) or MNE (E). Only identified elements are listed, so some element distributions do not equal 100%.

[a] Totals are based only on the First Phase collection and do not include Structure M8-10 data from the Petexbatun Project, which are presented in column for 14A.

Table 9.7. Percentage of Juvenile (J) and Left (L) Elements in the Structure Assemblages.

	Palace Group					
	22B: M7-32 Palace (Termination)		22A: M7-22 Palace (Termination)		22A: M7-22 Palace (Easternmost Room)	
Taxon	%J	%L	%J	%L	%J	%L
Total Fish						
Amazona sp.	0.00	0.00				
Galliforms and likely						
Total Birds	**0.00**	**0.00**				
Didelphidae						
Artibeus lituratus					0.00	100.00
Coatis/Raccoons						
Dogs	100.00	56.52		40.00		75.00
Felidae, not large		**33.33**	**0.00**	**100.00**		
Felidae, large			**0.00**	**75.00**		
Total Cats		**33.33**	**0.00**	**80.00**		
Tayassuidae		50.00			0.00	100.00
Odocoileus virginianus	33.33	38.46	50.00	75.00	33.33	66.67
Mazama sp.			0.00	0.00		
Cervids	**33.33**	**38.46**	**33.33**	**66.67**	**33.33**	**66.67**
Artiodactyls	**33.33**	**39.29**	**40.00**	**70.59**	**28.57**	**71.43**
Agouti/Paca						
Sciurus sp.						
Muridae			100.00		0.00	0.00
Total Mammals	**50.00**	**47.62**	**25.00**	**56.25**	**14.29**	**72.73**
Total Vertebrates	**40.00**	**46.51**	**25.00**	**56.25**	**14.29**	**72.73**
Total	**6.67**	**46.51**	**3.39**	**56.25**	**0.14**	**72.73**

	Causeway Area													
	23A: M8-4 (Mirrors)		20A: M8-8 (Axes)		14A: M8-10 (Scribe)*		14B: M8-13		23B: M8-2/3		21A: M7-91/92		21A: M7-34 (Metates)	
Taxon	%J	%L	%J	%L	%J	%L	%J	%L	%J	%L	%J	%L	%J	%L
Total Fish				**100**										
Amazona sp.														
Galliforms and likely							**0**	**100**					**0**	**100**
Total Birds							**0**	**100**					**0**	**100**
Didelphidae				0									100	100
Artibeus lituratus														
Coatis/Raccoons	**0**	**100**									**0**	**100**		
Dogs		30	0	50				33			0		0	100
Felidae, not large			**0**	**0**									**0**	**100**
Felidae, large	**0**	**50**												
Total Cats	**0**	**50**	**0**	**67**									**0**	**100**
Tayassuidae			100						0				0	50
Odocoileus virginianus	0	60	0	50	100	100	50	62.5	0	0				
Mazama sp.	0	0	0	100			0		0				0	0
Cervids	**0**	**43**	**0**	**62.5**	**100**	**100**	**33**	**62.5**	**0**	**0**			**0**	**0**
Artiodactyls	**0**	**50**	**25**	**57**	**100**	**100**	**40**	**62.5**	**0**	**0**			**0**	**28.6**
Agouti/Paca	0	0	0	100			0		0	100				
Sciurus sp.														
Muridae			0	33										
Total Mammals	**11**	**41**	**6**	**56**	**100**	**100**	**25**	**54.5**	**0**	**33**	**0**	**100**	**20**	**50**
Total Vertebrates	**11**	**41**	**6**	**57**	**100**	**100**	**20**	**58**	**0**	**33**	**0**	**100**	**16.7**	**54**
Total	**4**	**41**	**0.6**	**57**	**100**	**100**	**7**	**58**	**0**	**33**	**0**	**100**	**2.6**	**54**

TABLE 9.7. (cont'd.) Percentage of Juvenile (J) and Left (L) Elements in the Structure Assemblages.

	BARRANCA		GRANADA			
	24A		26A&B, 27A		TOTALS*	
TAXON	%J	%L	%J	%L	%J	%L
Total Fish				**0.00**	**—**	**50.00**
Amazona sp.					0.00	0.00
Galliforms and likely	**100.00**				**33.33**	**100.00**
Total Birds	**100.00**				**25.00**	**66.67**
Didelphidae	0.00	100.00			50.00	66.67
Artibeus lituratus					0.00	100.00
Coatis/Raccoons					**0.00**	**100.00**
Dogs	100.00	100.00	0.00	100.00	16.67	51.85
Felidae, not large			**0.00**		**0.00**	**50.00**
Felidae, large	**0.00**	**43.37**			**0.00**	**44.94**
Total Cats	**0.00**	**43.37**	**0.00**		**0.00**	**46.39**
Tayassuidae					25.00	57.14
Odocoileus virginianus			0.00		31.25	55.56
Mazama sp.					0.00	25.00
Cervids			**0.00**		**22.73**	**50.94**
Artiodactyls			**0.00**		**25.58**	**53.33**
Agouti/Paca	0.00		0.00		0.00	66.67
Sciurus sp.			0.00	100.00	0.00	100.00
Muridae	50.00				40.00	25.00
Total Mammals	**28.57**	**44.71**	**0.00**	**100.00**	**15.58**	**50.20**
Total Vertebrates	**37.50**	**44.71**	**0.00**	**66.67**	**15.85**	**50.39**
Total	**30.77**	**44.71**	**0.00**	**66.67**	**1.41**	**50.39**

Note: All values are percentages of elements identified to age or sex (i.e., %juvenile of all elements for which side could be determined, %left of all elements for which side could be determined). Values in bold are combined values for various taxas (i.e., total birds includes parrots, galliforms, etc., and birds identified only at the class level).

* Totals are based only on the First Phase collection and do not include Structure M8-10 data from the Petexbatun Project. In this table only values from the First Phase are included and samples are therefore too small for some analyses.

no juveniles were found among the 4 aged cat/dog individuals. The rate of burning for dogs was consistent overall with the rest of the site, including that for cranial elements (53 percent), limb elements (40 percent), and distal elements (50 percent).

Cats

Cats represent only 1 percent of the NISP and MNI of the Aguateca assemblage, but their distribution and high ubiquity across the Aguateca residences (in nine of the loci studied here) is revealing given the natural rarity of these high-order, forest-dwelling predators and their symbolic role in ancient Mesoamerican life. The cats are iconographically linked to concepts of power and kingship (Ballinger and Stomper 2000; Benson 1998; Saunders 1994), and their remains are significantly more frequent among the deposits of the ruling elite at the Petexbatun sites (Emery 2010), Piedras Negras (Emery 2007), Motul de San José (Emery 2012), and elsewhere. Cat remains with cut marks are often found, suggesting skinning (e.g., at El Kinel; Sharpe 2011). (For an example of pelt skinning, see also Demarest et al. 1991.) Cat remains were found in all structures except Structures M8-2, M8-3, M7-91, M7-92, and M8-13 (the last structure had only 2 teeth). These include, then, the elite and ritual loci but not the lower-status residences or special-function structures. Cat remains are most common in the Barranca Escondida, the Granada Group, the M7-32 and M7-22 termination deposits, and Structure M7-34.

It has been suggested that the large jaguar was symbolic of rulership and used only by the highest elite, with lesser cats representing the other orders of nobility (Saunders 1998). Jaguar remains are found primarily in the Barranca Escondida, the M7-22 termination deposits, and Structures M8-4 and M8-10. Assuming that the Barranca Escondida find is a special ritual deposit, possibly a sacrifice, this distribution pattern confirms that access to the largest cats was limited to the royalty and highest elite. However, it is surprising, then, that they are not also found in the other royal or high elite buildings, Structures M7-32 and M8-8, where the only remains are of small and intermediate cats. Perhaps this is a result simply of the slice of time represented and large jaguars happened not to be part of the abandonment assemblage, but perhaps this distribution offers additional insight into the residents' status or the role of cats. Overall the cats are found to be proportionately more weathered, but this is a result of a single jaguar carcass found in the Barranca Escondida. Otherwise their elements are fairly complete and have been subjected to the same degree of burning as other specimens at the site. Although by NISP jaguars are the most frequent of the cats, by MNI they represent a fairly small proportion of the cats overall (suggesting the use of separate elements rather than whole carcasses).

For all cat species, no juveniles were found, and the elements were approximately evenly distributed between the body sides. Very few of the remains were modified into artifacts (at least that could be identified). In particular, large cat teeth were not included among the artifacts recovered, though those of intermediate-sized cats were. The proportionate burning of the specimens was low, suggesting that they were protected at the time of the burn event, possibly in skins or as bundles. The cats are unlikely to have been complete carcasses (or live individuals), except for the fairly complete jaguar remains found in the Structure M7-22 termination deposits and the Barranca Escondida. Partial remains of jaguars include 3 humeri, 2 tibiae, and 2 distal elements, and those of the intermediate-sized and small cats, including ocelot and margay, comprise 5 canines, 2 humeri, 1 ulna, and 1 phalanx. A predominance of distal elements might be expected if skins were used, but the use of humeri and other long bones suggests an alternative function for these limb elements. It is possible that they were used symbolically either as limbs (humerus + radius + ulna + distals, perhaps) or as bones themselves (the predominance of humeri is important here, as are the uses of carved ulnae at sites like Piedras Negras [Houston, Escobedo, Child et al. 1998]).

It is also possible that these larger limb bones were used in the production of artifacts. Although none was found as debitage at Aguateca, manufacturing refuse was found in worked bone assemblages from neighboring Dos Pilas (Emery 2010).

Armadillo

Another fairly common intermediate-sized animal was the armadillo, represented entirely by scutes or segments of its bony shell, except the single tarsal found in Structure M8-10, suggesting that feet were sometimes included. Although the animal would have also been eaten, the remains recovered from the house floors at Aguateca are most likely the remains of curated armadillo skins (sometimes including the feet), and the appendicular elements were discarded elsewhere or perhaps never entered these structures if the skins were processed in other locations. Armadillo skin bags are used today for a variety of purposes, including seed holders during planting. God L has been suggested as having an armadillo as a *way* (a spirit companion) and is depicted wearing an armadillo carapace cape (Kerr and Kerr 2005:79). Benson (1997:59) notes that these animals were sometimes depicted as a seat for the Earth God. Armadillos, as superb diggers, were also associated with the earth, agriculture, and the underworld (their nine bands duplicating the nine levels of the underworld) and were connected to music in many iconographic depictions and in the Popol Vuh (Benson 1997:58).

My ethnozoological studies in both the Peten and highland Guatemala have shown armadillo carapaces to be one of the most common curated animal remains, saved as decoration, as vessels, and most often as raw material for medicinal cures (Emery 2011). These curated skins are stored near the kitchen fire and are smoked to preserve them. Supporting this argument for the skins as curated elements is the fact that the Aguateca armadillo carapace segments are predominantly burned (95 percent, a much higher rate than the norm for the animal remains, duplicated only by the turtle carapaces). In addition, they are found only in Structures M7-22 (easternmost room), M8-4, M8-8, and M8-10 and the Granada Group, all residences of the highest elite. They are not typically listed among high-status animals, but their skins might indeed have been important elite curated items.

Agouti and Paca

Also ubiquitous among the intermediate mammal group at the site were the large rodents, the agouti and paca. Their ubiquity was surprising considering the oft-cited assumption that these would have represented a lower-status food choice item with few other roles. These rodents were found in seven structures, including the elite residences of the Granada Group, Structures M8-4, M8-8, and M8-10, but also in the lower-status or nonresidential structures of M8-13, M8-2, M8-3, M7-91, and M7-92. They are found in highest MNI proportions in Structures M7-91 and M7-92 (nonresidential/low status) and the Granada Group (high status, possibly also a nonresidential deposit). These species are considered together here, but they have significantly different behaviors—the larger paca prefers disturbed areas and is often a crop pest, while the smaller agouti is more reclusive and nocturnal and prefers forested areas.

These animals are skeletally fully represented with 38 percent of the remains being teeth, 28 percent distal elements such as metapodials and phalanges and also including limb bones. This distribution is strongly suggestive of complete animal carcasses butchered in or near the structures and not shared between households. However, this distribution is not consistent over the site, as only teeth and toes are found in Structures M8-4; only teeth in Structures M8-8, M8-13, M8-2, and M8-3; a single humerus in Structures M7-91 and M7-92; teeth and upper limb elements in Structure M8-10; and a very complete skeletal representation in the Granada Group. No juveniles were found, none of the remains were fashioned into artifacts, and the distribution of left vs. right elements is very close to 50 percent. The burn rate is fairly standard but is proportionately higher among lower limb and distal remains, perhaps indicative of the cooking method (roasting with bone would protect the limb bones and leave the feet exposed) or of differential curating of limbs vs. feet. Curated skins might retain distal portions, and these would therefore be overrepresented and/or overexposed to burning. In the Peten, paca carcasses are also curated for medicinal purposes, with smoked feet and heads being the most common curated body portions (Emery 2011).

Peccaries

It is very difficult to distinguish the two peccary species using postcranial remains, so they are presented together here. They are often also indistinguishable in iconographic representations but have very different habits: the generally larger white-lipped is a more reclusive species while the collared is a known crop pest, preferentially feeding on dropped fruit in orchards. The peccaries were symbolically linked with rain, the sky, and the hunt (Peterson 1980; Tozzer and Allen 1910), and possibly the transfer of cargo responsibility for agricultural success (Pohl 1981:515). Peccary is also one of the favored meats of the Maya. In the Aguateca assemblage, they are fairly infrequent, representing less than 1 percent of the site NISP and MNI. They are found in only five locations across the site, in highest numbers in the M7-32 termination deposits, where they include 75 percent cranial fragments and a single distal element (perhaps representing a hide?), and in Structure M7-34, where they appear to represent a complete cranium. Site-wide, they are represented primarily by cranial elements, including all portions of the cranium, not just isolated teeth. Hind limbs are also found in a few locations. One of the individuals was a juvenile. However, there is no evidence of a greater proportion of left or right elements or any other indication of ritual treatment. Very low proportions of the specimens are burned in comparison to other assemblages, and particularly the crania found in Structures M7-32 and M7-34 were rarely burned. It is possible that the peccary heads were still fleshed or within a skin (or that the cranium bones were within a bundle).

White-Tailed Deer

The white-tailed deer is one of the most ubiquitous species at Maya sites and was important as food, as a source of hide and tools, and for a multitude of symbolic links (see Carr [(1996] for an excellent discussion of the deer and ancient Maya; also Emery [2010:64]). Some have suggested they were husbanded (Pohl and Feldman 1982; White et al. 2001), and they were undoubtedly at least managed (Carr 1996). They have been proposed as an elite favorite and are found in higher proportions in some elite deposits, particularly during the Late Classic (Pohl 1994a). However, that is not always the case, and they are sometimes found in higher proportions in non-elite deposits (Sharpe 2011; Teeter and Chase 2004). The white-tailed deer is the most frequently occurring mammal at Aguateca by NISP and the second-most frequent by MNI after dogs. They are found in 10 of the 12 loci (not in Structures M7-34, M7-91, and M7-92) and in greatest proportions in Structures M7-32, M8-4, and M8-13 and the Granada Group. In general, the white-tailed deer remains are well preserved, though they are fairly heavily fragmented and almost half are burned, in keeping with those of the rest of the faunal collection. The elements are dominated by upper hind limbs, while other limb segments (upper front, lower hind) are also out of proportion to the expected (given that there are only one or two bones in each of these limb segments compared with the multitude of teeth, toes, vertebrae, and ribs that each animal possesses). With the exception of antlers, no cranial elements are represented. The preponderance of upper limb elements is similar to that found in elite deposits at many Maya sites (Emery 2012; Pohl 1985; Sharpe 2011), and it is likely that the residents had preferential access to the meatiest portions of the animal. However, it should also be emphasized that these portions contain the bones that offer best scope for crafting (Emery 2008), and a large proportion of the deer elements at Aguateca were modified by crafting. These include primarily finished artifacts in most structures (Structure M8-2, M8-3, M8-8, the easternmost room of M7-22, and the M7-32 termination deposits) but primarily crafting debitage in Structures M8-4 and M8-13.

Finally, it is worth considering that, as with many of the other species found in the Aguateca assemblage, the white-tailed deer elements were used for purposes other than food or raw material for crafting. Ethnohistoric notes regarding the offering of meaty haunches to the religious leaders and the deities (Bricker 1991; Taube 1988; Tozzer 1941) might also suggest that these remains sometimes represent offerings. Almost a quarter of the elements were from juveniles, representing the highest proportion of juveniles in any species at Aguateca, but it is comparable to that found in other archaeological assemblages and modern highland Maya hunting caches today (Emery and Brown 2012). This is particularly true for femurs, of which almost half were from juvenile individuals. Although the overall proportion of left and right elements among those sided was equal, the front limb elements were almost exclusively lefts, as were the femurs (including the juveniles), while the tibiae were predominantly rights. The sample is too small to justify further interpretations of this unusual distribution, but it is interesting to note a similar distribution among the cave fauna of Los Quetzales (Emery 2004; Pohl 1990). Pohl (1983, 1990) has suggested that an emphasis on juveniles and on specific body sides (see also Palka 2002) relates to ritual uses.

Brocket Deer

The brocket deer is a very small cervid and an intermediate-sized mammal but is usually classed with the white-tailed deer. The two species have very different habitat preferences, with the brocket deer being much more reclusive and generally found in the deep forest or among thick vegetation where it can easily hide, and the white-tailed being a well-known crop pest whose numbers often increase in disturbed habitats. Tozzer and Allen (1910) suggested on the basis of similarity in artistic representation that the Maya may not have differentiated between them, but the very different treatment of the brocket and white-tailed deer does not support that contention. The Aguateca skeletal distributions suggest that here the two deer species were used quite differently. The brocket deer represents only a small proportion of the assemblage and is found in only seven loci: the Structure M7-22 termination deposits (a femur), Structure M8-4 (head), M8-8 (head), M8-10 (head, toes, humerus), M8-13 (a toe), M8-2 and M8-3 (a toe), and M7-34 (cranium with antler, tibia). Its remains are dominated by cranial specimens, including antler, frontal skull segments (those to which the antler attaches), and mandibles. These appear to primarily represent three brocket deer heads, found in Structures M8-4, M8-8, and M7-34. The Structure M8-10 remains include antler, humerus, and metapodials, so are quite unlike the assemblages in the other structures, except that as elsewhere none of these remains are worked. Unlike the white-tailed deer, very few of the brocket deer remains are from juvenile individuals (except those in Structure M8-10), and the sided segments are predominantly rights (skull portions and mandible portions in most structures and limb elements in Structure M8-10). The brocket deer remains are proportionately less burned than are other species (22 percent, particularly the non-antler segments), and the elements are fairly complete (55 percent). As with the peccary remains, it is possible that these crania were still fleshed, covered in skin/hide, or bundled, protecting them from burning.

Possible Intrusives

Several remains were identified from various small taxa that may have been intrusives, including opossums (4 specimens representing 3 elements and individuals, 75 percent of which were eroded but unburned), which are commonly attracted to human settlements and their garbage and pests; bats (3 specimens representing 2 individuals, all unburned and uneroded), which huddle in the crevices of some structures and, in the case of the larger fruit eaters, are attracted to gardens with fruiting trees; squirrels (2 examples representing 2 individuals); and murid rodents. Since the numbers are small and there is limited indication of unusual distributions of elements, age, or body side in any of these taxonomic assemblages and very few are burned, I favor the argument that they are intrusive. (However, see Navarro and Arroyo-Cabrales [2013] for a discussion of bat symbolism and zooarchaeology and Barragán et al. [2007] for a review of modern trade in small rodents as foodstuffs in Mexican markets.) These animals are also used in medicinal healing rituals, particularly associated with childbirth (squirrels, small rodents, and opossum) and witchcraft (bat) (Emery 2011). Also often included among the intrusive smaller mammals are the raccoons and coatis. A very small number of elements were recovered from the coati (a tooth in Structures M7-91 and M7-92), raccoon (an artifactually modified and burned radius in Structure M8-4), and several unidentified small carnivores that were possibly raccoons, coatis, foxes, or very small dogs (including 4 artifactually modified teeth, half burned, in the House of Axes).

Discussion

The faunal remains of Aguateca reveal an intriguing glimpse of manners of animal use and storage. The Aguateca animal assemblage may well include some garbage, but because the Maya likely removed animal refuse to some distance unless it was provisionally discarded for later use (Emery and Brown n.d.), we are not looking at simple trash. With the exception of those from the Granada Group and the Barranca Escondida, the Aguateca animal remains likely instead represent the residue of interrupted food preparation and crafting, and stored goods such as provisioned foods and raw materials for crafting, curated medicinals, clothing, and ritual paraphernalia. Thus they provide an important insight into the role of animals beyond food and also some thought-provoking questions about the "zooarchaeological markers" of food, status, crafting, and ritual.

Status

Zooarchaeological remains are often used in the assessment of status differences between community members. Multiple zooarchaeological studies have suggested that animal remains from higher-status residences include a higher diversity of animal species (Pohl 1985, 1994b; but see Emery [2007a], Sharpe [2011], and others for examples where diversity is not well correlated with status), larger proportions of those taxa most favored either as food (large game such as deer, peccary, and large turtles; Emery 2003a; Moholy-Nagy 1994; Pohl 1990; Teeter 2001) or as ritual symbols such as cats or crocodiles (Emery 2012; Pohl 1983), exotics such as marine shell and fish (Masson 1999b; Sharpe 2011; Shaw 1999), and more favored body portions (large meat-bearing haunches; Emery 2012; Masson 2008; Pohl 1990; Sharpe 2011; Teeter 2004; Thornton 2012). Other species are considered to have been food of the lower classes, often with some zooarchaeological justification. Sharpe (2011) reports that cichlid fishes were found predominantly among the lower-status residences in her study of sites in the Sierra Lacandon and Petexbatun.

Inomata and colleagues have superb data by which to compare status among the residences of the site. Indeed, we see the largest proportion and diversity of the most exotic and "costly" materials clustered in the Palace Group and the largest residences along the Causeway. These include the Pacific and Caribbean molluscs, as well as the jaguar, which was found only in the Palace Group and Structures M8-10 and M8-4. Structure M8-13 has far fewer of these materials, and the possible nonresidential structures fewer still. However, other "status markers" such as the large Central American river turtle, large quantities of deer limb elements, and rarer species such as smaller cats are less clearly defined. The Central American river turtle is found in the elite structures M8-4 and M8-10 but also in the less wealthy structure M8-13 and in Structure M7-34, and not at all in the Palace Group or Structure M8-8. The "lower-status" musk turtles are found in the elite structures M8-4, M8-8, and M8-10. The turtle distribution is more likely associated with their function than with their symbolic representation of wealth or power within the community. The same could be said for the white-tailed deer, favored food animal and symbol. This species is found in all deposits except those of Structure M7-34. The highest proportions of deer remains are in Structure M8-13 and the Palace Group deposits, two ends of the status spectrum. But in all but the Palace Group the remains of the deer are consistently modified into artifacts, generally perforators.

Specialization

Evidence from other artifact classes indicates that the domestic activities of food preparation were carried out in each household with little evidence of specialization at that level. Triadan (2000) emphasizes that the residents of Aguateca's elite core stored and processed food (at least maize) within and around their domiciles and that they or their co-residents (perhaps servants) were directly involved in food production. Research at other sites reinforces this conclusion (Hendon 2000; Sheets 1992). Undoubtedly this was also the case for animal food preparation. However, there is some indication that the butchering of animals was not done at all households (and therefore that not all residents were hunters who acquired their own carcasses, but that carcasses were already somewhat reduced by the time they entered each household).

Support for this comes from the fact that no household has complete carcasses of any animals except for Structure M8-13, which has much more complete remains from paca than are found elsewhere. This is also supported by the fact that the Granada Group has greater skeletal completeness for most animals than are found in the Causeway area buildings, although this is partly because complete animal carcass remains were not left lying about on house floors (although portions in the process of preparation would have been found in activity areas on any given day). Additional support comes from the distribution of butchering evidence (very rare at Aguateca and all Maya sites), found primarily in Structures M8-13, M7-91, and M7-92 and rarely if at all in other structures. It should be noted that an animal could, of course, be butchered in a separate location (a kill site or a separate building), and yet the bone itself would carry the butcher mark to its final location of discard. Thus these marks are problematic for any assessment of where butchery might have occurred.

Marine shell crafting evidence is spread across the community with debitage from working strombs and Pacific olives found in Structure M7-32, large gastropods in Structure M8-4, and secondary working of large olives (not Pacific) possibly in Structures M8-8, M8-2, and M8-3. Such shell working is also found at other sites (e.g., Aoyama 1999; Hohmann 2002), although with less evidence of specialization among households. River clam crafting remains are more ubiquitous, found in Structures M7-22, M8-4, M8-2, M8-3, and M8-10, and possibly as butchery only in M8-13. Large mammal long bones were crafted in early stages in Structure M8-13 and to a certain extent in Structure M8-10, but were secondarily reduced in Structures M8-8, M8-4, M8-2, and M8-3, likely as part of upkeep of a tool kit for textile and leather working. Whatever activities were conducted in Structures M8-8 and M8-10 required the use of an armadillo skin.

And what about the task of curating ceremonial implements? Could that role be indicated by the presence of musical instruments and costume elements? Complete turtle drums/rattles, most indicative of music (the carapaces of these and the larger species could also have been curated for other reasons), were found in Structures M8-8, M8-4, M8-2, and M8-3 only. Bone rasps, which might also have been used for music, were found in Structures M7-22, M8-10, and M8-4. Crania of peccary (Palaces and House of Metates) and brocket deer (Structures M8-8, M8-4, and M7-34) may represent curated mask elements, complete heads, or possibly skins, undoubtedly parts of costumes. Possible skins of dogs (Structures M7-22 and M8-8) and cats (Structures M8-10 and M8-13) could also have been part of costumery or display elements (we should also consider the armadillo skins in this grouping, in Structures M8-8 and M8-10).

Ritual and Curing

The use of certain taxa to indicate various rites, symbolic links, or characters in theater and dance is well accepted, but little direct zooarchaeological evidence is available for an assessment of these links. Certain animals are found with greater frequency in caches, burials, and other "ritual" deposits, including cats, dogs, and deer (Freidel and Reilly 2009; Masson 2008:180–181; Pohl 1981; White et al. 2001). Connections are indicated between ritual deposits and juvenile animals (Emery 2004; Pohl 1981, 1983), particular body portions (specifically crania; see Masson 1995, 1999a; Stanchly 2007), or body sides (specifically left associated with the underworld; see Gossen 1974; Palka 2002; Pohl 1983:89–90; Pohl and Pohl 1983). Codex and ethnohistoric references also provide a wealth of information about the role of specific animals in ceremonies, often those associated with the cycles of time and life (Bricker 1991; Taube 1997; Tozzer 1941), where they are foods, actors, and sacrifice victims (Emery et al. 2009). Ethnographic studies reveal a continuing tradition of use of curated animal remains as offerings during hunting ceremonies (Brown and Emery 2008) and as elements in direct and ritualized healing (Emery 2011).

The distribution of species and skeletal elements strongly suggests that many of the remains found at Aguateca were associated with ceremonies of some sort, particularly such remains as the brocket and peccary crania and the cat elements. How the animal remains were incorporated into the ceremonies is more difficult to discern since the possibilities are endless. Studies by Brown at Cerén are informative in this regard. In Structure 10 of that site, she and co-author Sheets propose that storage of ritual paraphernalia is represented by certain remains, including a white-tailed deer skull headdress, a matched set of bone tube beads, a bone ornament, and a shaped deer scapula. In an associated structure (12), a deer antler with perforations (which they suggest are for threading with feathers) was interpreted, along with other artifacts, as the "supernatural tool kit" of a diviner (Brown and Sheets 2000). These are reminiscent of the Aguateca brocket deer crania and antler finds. Several researchers have pointed out that deer were regular actors in various ceremonies (Brown 2005; Hellmuth 1996; Pohl 1981; Taube 2003; Vail 1997) and that their characteristic elements (antlers, ears, hooves, etc.) were often used to signify the "owner" or "god" of the animals, which was named Sip or Wuk Sip in Postclassic and colonial Yukatan (Brown and Emery 2008; Taube 1997). Today in the Santiago Atitlan Cofradía San Juan, dedicated to the "Lord" of the animals, a wealth of curated deer pelts (dance costumes) and taxidermied animal carcasses are stored in the structure for use in on-site rites associated with healing, hunting, and often childbirth (Brown and Emery 2008). These are usually white-tailed deer, but a similar use could be postulated for the brocket deer at Aguateca.

A slightly different role might be proposed for the peccary at Aguateca. Even today, peccaries are the principal figure in the "Dance of the Pig Head," performed during an annual ceremony associated with the agricultural cycle (Pohl 1981:515; Reina and Hill 1980). In San José Peten, a "pig head" of papier-mâché is displayed on a wooden table and used in annual religious ceremonies (Emery, unpublished research notes), likely a descendant of the same display shown in photographs by Ruben Reina (see the Ruben E. Reina Papers database of the American Philosophical Society). A similar use of the peccary cranial elements at Aguateca might be possible. If the Aguateca crania were indeed used in costumes or for performance, they might well have been covered in skin or have been bundled when not in use, which might have protected them from burning during the abandonment.

A final observation may be related to ritual or perhaps to occupation and status, and that is the distribution of the front limbs of a diversity of animals, particularly those considered "special." Structure M8-4 has the front limb of a jaguar, M7-22 an intermediate-sized cat, M7-34 an ocelot, M8-8 a margay, M7-32 a dog (and a parrot wing), M8-13 a dog, and M7-91 and M7-92 a paca. It is intriguing to posit that these were emblematic of something for the residents of each structure, but of course the finds are far too few for us to make any such conclusion.

The Final Days of Aguateca

Finally, the animal remains can also provide some information about the process of abandonment. The Aguateca animal remains were predominantly burned (over 50 percent of the vertebrates), in keeping with the rest of the artifacts and indicating a final burn event during or following abandonment. Likewise, the remains showed only minimal results of weathering and exposure to animals and the elements following deposition, suggesting that these remains were covered quickly following abandonment. However, the proportion of the animal remains burned at each structure varies, as does the degree of weathering. In part, as described above, this variability is the result of different treatments of the animal remains before the moment of abandonment. Today the remains of armadillos, turtles, agoutis, and other taxa curated in Maya kitchens and elsewhere are smoked and burned to preserve them for later use as vessels and medicinal/healing supplies. The excessive burning on the Aguateca armadillo and turtle remains argues for this activity here as well. However, the pattern of burning and weathering also suggests slight differences in site abandonment.

Weathering was the highest in the Barranca Escondida, which is not surprising given the nature of this locus. However, weathering was also very high at Structure M7-34 (6 percent) and the associated structures M7-91 and M7-92 (5 percent). This might suggest that the remains found there had been discarded somewhat earlier, or more likely this is because a large portion of their assemblages was found in areas not protected by structure collapse. Although less marked, the remains of the Structure M7-32 termination deposits were also more heavily weathered (2 percent) than those of the Structure M7-22 termination deposit (0.5 percent). This may have implications for further differences between these two assemblages in addition to the taxonomic and element distribution differences already noted. Although it is generally found that weathering and high fragmentation of skeletal elements (and carcasses) are correlated with animal food garbage deposits (Lyman and Fox 1989; Stahl 1995), here we see no correlation between these two factors. In fact, where weathering is highest, the rate of fragmentation is very low. This underscores the argument that the Aguateca animal remains, although sometimes exposed to the elements, were not the remains of garbage left for trampling by active residents. Instead, the fragmentation rate can be effectively correlated with the degree of crafting in the structures, a result of predepositional activities rather than postdepositional processes.

Burning tells another part of the story. The rate of burning of vertebrates was significantly higher than the site average at the Granada Group structures (95 percent) and Structure M8-4 (75 percent), while it was very low at the Structure M7-32 termination deposits (11 percent burned). One wonders again at the disparity between the M7-32 termination deposits and those of Structure M7-22

(63 percent burned). The other elite-associated structures all have higher burn rates (64 percent for Structure M8-8 and 57 percent for Structure M7-34), whereas considerably less burning is found at the lower-status residences and nonresidential structures of M7-91 and M7-92 (30 percent), M8-2 and M8-3 (33 percent), and M8-13 (33 percent). Perhaps the fires were concentrated in the areas of highest status and ritual importance such as the Palace Group, Granada Group, and Structures M7-34, M8-4, and M8-8, or perhaps, as suggested by Inomata, these structures contained a higher proportion of combustible furnishings and construction material (Takeshi Inomata, personal communication 2011).

CONCLUSIONS

The formation processes of the zooarchaeological record complicate our understanding of where animal resources were used and by whom; how they were used, reused, and discarded; and what they represent in terms of ancient ecologies and cultures. In the Maya area, unmodified animal bones and shell are often assumed to be food remains. Modified animal remains are classified as artifacts but are not analyzed in combination with the fragments that are the debris from their manufacture or unmodified but associated elements. The primarily in situ Aguateca remains remind us that the markers we use to distinguish status, activity areas, and even ancient ecology by means of animal remains must be understood in terms of their original use. The distribution of species and skeletal elements from the Aguateca Causeway area structures and the Palace Group do not accord with zooarchaeological expectations of status, occupation, or "ritual" markers, nor do they resemble assemblages from primarily midden deposits (such as in the Granada Group) or ritual discard areas (such as in the Barranca Escondida). At this fascinating site, most of the remains are unlikely to be those of food and more likely the abandoned elements of costumes and performance and display items, and the debitage associated with their manufacture and upkeep.

chapter

10

Food, Farming, and Forest Management at Aguateca

David L. Lentz, Brian Lane, and Kim Thompson

The catastrophic end to the settlement at Aguateca was undoubtedly traumatic for the last human inhabitants, but the vicissitudes they suffered resulted in a site of great scientific interest, especially in regard to paleoethnobotanical studies. The consequences of warfare at the site produced two outcomes that were highly favorable for the preservation and analysis of plant remains. First, many of the structures at the site epicenter were burned when the attack occurred, in the ninth century AD, so that plant materials, on activity surfaces or in storage in the interior of structures, were carbonized (a condition that enhanced their preservation). Normally in this part of the tropics, with alternating periods of heavy rainfall followed by months of dry conditions, organic materials degrade rapidly due to intense and pervasive microbial activity. Partial burning, however, consumes the macromolecules that attract microbes, insects, and other potential scavengers and creates carbonized remains that are inert, albeit brittle, remnants of plant use activities of the past. Second, the catastrophic burning followed by permanent abandonment ensured that many of the plant materials preserved at the site would be left in situ.

Maya sites often give the appearance of having been swept out at the time of abandonment, resulting in activity surfaces that are void of plant materials and other artifacts. The good fortune for archaeologists at Aguateca is that artifacts, plant remains in particular, are charred but in a recognizable condition and located in positions that provide an indication of past use. Only the brief occupation by the assailants and the collapse of structural features following abandonment caused any significant disturbance.

METHODS

Macrobotanical remains from Aguateca, retrieved through flotation or other means, were shipped to the University of Cincinnati Paleoethnobotanical Laboratory for analysis. All items were initially examined with a Zeiss Stemi 2000c binocular microscope adjustable from 6 to 60 power magnifications. To learn what woods were used for construction and other purposes, and to better understand the Late Classic Maya interaction with the surrounding forests, we conducted morphological analysis of all available charcoal samples collected at the site using electron microscopy.

Small subsamples (1 cm^2) of each charcoal specimen were fractured along transverse and tangential planes. They were then sorted into wood types based on specific morphological characteristics, such as the arrangement of vessels, rays, and parenchyma cells. Fractured charcoal specimens were mounted with colloidal graphite and scanned in a Philips XL30 Environmental Scanning Electron Microscope (ESEM) housed in the University of Cincinnati Department of Chemistry. Micrographs were recorded at 50× to 500× magnifications, and wood types were identified through comparison with vouchered wood collections and text references.

RESULTS

The botanical remains recovered from Aguateca reveal a diverse pattern of plant resource exploitation from both cultivated sources and the surrounding tropical forest (Table 10.1). The variety of species represented was unusual, greater than most other Late Classic Lowland Maya civic/ceremonial centers, largely due to the excellent preservation conditions caused by the burning of buildings near the end of the site's occupation. The various taxa recovered from the excavations are discussed in approximate phylogenetic order, as presented in Table 10.2, with conifers listed first followed by dicots and monocots.

Pinaceae (Pine family)

Pinus sp.: Pine charcoal was found in the royal residence (Structure M7-22, House of Masks) and in two elite

Table 10.1. Aguateca Plant Remains by Provenience.

Form Number	Provenience	Taxon/Plant Part	Associated Structure	Context
40001	S11 20A3-3-4	*Crescentia cujete* rind, dicot charcoal and seed coat, fungal tissue, unknown seed, *Zea mays* kernel	M8-8	North room on floor
40002	C5 20A19-2-1	Unknown organic concretion	M8-8	North room in wall fall
40003	C6 20A4-2-3	Dicot charcoal	M8-8	Center room floor
40004	S2 14B24-3-2	*Bactris* sp. endocarp, *Cucurbita* sp. rind, dicot charcoal, *Pinus* sp. charcoal	M8-13	Center room on floor in front of bench
40005	S8 20A11-2-2	Dicot charcoal and rind	M8-8	North addition near drainage area
40006	S77 20A19-3-1	*Cucurbita* sp. rind, dicot charcoal	M8-8	North room inside vessel
40007	C4 20A12-3-2	Dicot charcoal	M8-8	North addition on floor
40008	S48 20A8-2-3	Dicot charcoal, Fabaceae seeds, palm endocarp, *Protium copal* charcoal, cf. *Leucaena* sp. seeds	M8-8	Behind back wall of center room in wall fall
40009	S1 14B22-3-4	*Attalea cohune,* dicot charcoal, *Pinus* sp. charcoal, spermatophyte tissue	M8-13	Behind center room
40010	S46 20A12-3-1,2	Unknown charcoal and seed coat	M8-8	North addition on floor near vessel
40011	C3 20A5-3-1	Dicot fruit mesocarp	M8-8	In front of north room
40012	B2 20A39-2-2	Dicot charcoal	M8-8	South room in wall fall
40013	B7 20A23-3-1	Dicot charcoal	M8-8	Center room on floor
40014	B14 20A33-3-2	Dicot charcoal and diseminule	M8-8	Exterior south of structure
40015	B16 20A32-3-3	*Pouteria sapota* seed coat	M8-8	Exterior south of structure
40016	B20 20A31-3-2	*Pouteria sapota* seed coat	M8-8	South addition interior floor
40018	B6 21A25-3-1	Unknown vascular tissue	M7-34	Center room on floor
40019	B7 21A48-3-1	*Persea americana* cotyledons	M7-34	Area in front of structure inside circumferential wall
40020	B8 21A4-3-1	*Agave* sp. stems, *Attalea cohune* fibers, *Pouteria sapota* seed coat, monocot tissue, *Persea americana* pits	M7-34	Center room in front of bench
40021	B1 22A9-2-2	*Pouteria sapota* charcoal	M7-22	Termination ritual deposit in front of east front room
40022	B3 22A23-2-2	Dicot charcoal	M7-22	In front of easternmost room mixed with ceramics
40023	B5 22A10-2-4	*Zea mays* kernel	M7-22	Easternmost room in wall fall in front of bench
40024	B7 22A21-2-4	Dicot charcoal	M7-22	In front of easternmost room in wall fall
40025	B11 22A2-3-1	Dicot charcoal	M7-22	East room
40026	B16 22A10-2-5	Dicot charcoal	M7-22	Easternmost room on wall fall
40027	B22 20A31-3-2	*Cucurbita* sp. rind	M8-8	South addition on floor
40028	B23 20A31-3-4	*Cucurbita* sp. rind, *Pinus* sp. charcoal	M8-8	South addition on floor
40029	B9 21A48-3-2	Dicot charcoal	M7-34	In front of structure inside circumferential wall
40030	B12 21A30-3-3	Dicot charcoal and seed coat	M7-34	South room on floor
40031	B26 22A9-3-1	*Anacardium occidentale* charcoal, dicot charcoal, *Zea mays* cupules and kernels	M7-22	Termination ritual deposit associated with east front room
40032	22A6-3-1	*Pinus* sp. charcoal, *Zea mays* kernels and cupules	M7-22	Termination ritual deposit in east front room
40033	B28 22A10-2-8	*Zea mays* meal	M7-22	Easternmost room in front of bench in wall fall
40034	B31 22A14-3-2	*Gossypium hirsutum* fiber, *Zea mays* kernels	M7-22	Easternmost room on floor in front of bench
40035	B22 22A6-2-3	*Zea mays* kernel	M7-22	Termination ritual deposit in east front room
40036	B14 22A14-2-5	Fiber impressions, dicot charcoal, monocot leaf impression, *Portulaca* sp. seed, *Zea mays* meal	M7-22	Easternmost room in front of bench in wall fall

Table 10.1. (cont'd.) Aguateca Plant Remains by Provenience.

Form Number	Provenience	Taxon/Plant Part	Associated Structure	Context
40037	B21 20A31-3-2	*Byrsonima crassifolia* pit, *Cucurbita* sp. rind, Lauraceae charcoal, spermatophyte tissue, *Zea mays* kernel and burned meal	M8-8	South addition around vessel
40038	B24 20A35-3-1	Spermatophyte tissue, *Zea mays* meal	M8-8	South addition
40039	B1 21A8-3-4	Spermatophyte tissue	M7-34	In front of north room underneath metate
40040	B4 21A25-2-2	*Agave* sp. leaf, *Ficus* sp. seed, fungal sporocarps, spermatophyte tissue, *Zea mays* cupule	M7-34	Center room in wall fall
40041	B10 21A50-3-1	*Byrsonima crassifolia* pit, fungal sporocarp	M7-34	In front of structure inside circumferential walls on floor
40042	B11 21A51-3-1	*Capsicum annuum seed*, dicot charcoal	M7-34	In front of structure inside circumferential wall
40043	B50 22A45-2-1	*Attalea cohune* exocarp, dicot charcoal	M7-22	Termination ritual deposit west of westernmost room
40044	22A45-3-1	*Anacardium occidentale* charcoal, *Zea mays* cupules	M7-22	Termination ritual deposit west of westernmost room
40045	22A45-3-1	Dicot charcoal	M7-22	Termination ritual deposit west of westernmost room
40046	B53 22A49-2-1	*Cordia alliodora* charcoal and fruit	M7-22	Termination ritual deposit west of westernmost room in wall fall
40047	B54 22A48-3-1	*Annona* sp. spine, *Manilkara zapota* charcoal, dicot rind	M7-22	On floor in front of westernmost room
40048	B102 22B42-2-3	*Clusia* sp. charcoal, monocot stalk, *Zea mays* kernel	M7-32	Termination ritual deposit over broken niche of center room
40049	B103 22B42-2-4	Dicot charcoal, *Zea mays* kernels and cupules	M7-32	Termination ritual deposit over broken bench niche of center room
40050	22B13-3-1	*Zea mays* kernel	M7-32	Termination ritual deposit over broken part of bench in center room
40051	B105 22B13-2-4	Dicot charcoal, *Zea mays* kernel	M7-32	Termination ritual deposit over broken bench niche in center room
40052	22B42-3-1	*Zea mays* kernel	M7-32	Termination ritual deposit in broken bench niche in center room
40053	B107 22B13-3-1	*Zea mays* kernel	M7-32	Termination ritual deposit over broken part of bench in center room
40054	B2 23A6-3-2,4	Monocot epidermal tissue, spermatophyte tissue, *Zea mays* kernel	M8-4	South room on floor in front of bench
40055	B3 23A28-3-3	*Psidium guajava* fruit, unknown seed	M8-4	South room inside vessel
40056	B4 23A5-3-2	*Persea americana* cotyledon	M8-4	South room on bench
40057	B5 23A27-3-2	Dicot charcoal	M8-4	South room in front of bench
40058	B6 23A11-3-2,4	Dicot charcoal, *Pinus* sp. charcoal	M8-4	Front part of center room on floor
40060	B8 23A5-3-1	*Haematoxylon campechianum* charcoal	M8-4	South room on floor
40061	B9 23A29-3-4	Unknown tissue	M8-4	South room on floor
40062	B10 23A10-3-4	Monocot leaf	M8-4	South room on floor in front of bench
40063	B11 23A19-3-4	Unknown tissue	M8-4	North room on floor
40064	B12 23A44-3-4	Unknown carbohydrate	M8-4	North room on floor
40066	B17 23A14-2-2	*Psidium guajava* fruit	M8-4	Center room in front of bench
40067	B18 23A21-3-2	*Attalea cohune* endocarp, *Theobroma cacao* seed	M8-4	North addition on floor
40068	B19 23A44-3-3	*Manilkara zapota* charcoal	M8-4	North room on floor
40069	23A44-3-1	*Annona* sp. cotyledon, *Capsicum annuum* seeds, *Phaseolus* sp. cotyledon	M8-4	North room inside ceramic vessel

Table 10.1. (cont'd.) Aguateca Plant Remains by Provenience.

FORM NUMBER	PROVENIENCE	TAXON/PLANT PART	ASSOCIATED STRUCTURE	CONTEXT
40070	B21 23A44-3-1	*Pinus* sp. charcoal, dicot charcoal and stem, spermatophyte tissue	M8-4	North room inside ceramic vessel
40071	B22 23A19-3-1to4	cf. *Syngonium podophyllum seed*, unknown seed coat	M8-4	North room inside vessel
40072	B24 23A42-3-2,4	Spermatophyte tissue	M8-4	North room on floor
40073	B25 23A22-3-1	*Cucurbita* sp. rind	M8-4	North addition on floor
40075	B26 23A32-3-1	*Anacardium occidentale* charcoal	M8-4	North room inside vessel
40076	B28 23A21-3-1	*Acrocomia aculeata* endocarp	M8-4	North addition on floor
40077	B29 23A55-3-1	Dicot charcoal	M7-34/M8-4	Back of structure
40078	B30 23A18-3-4	*Cucurbita* sp. rind	M8-4	North room on floor
40079	B31 23A13-3-2	Monocot fibers	M8-4	Center room on bench surface
40081	B32 23A42-3-2	*Acrocomia aculeata* endocarp, dicot charcoal	M8-4	North room on floor
40082	B1 23B7-2-1	Dicot charcoal	M8-3	Southeast corner in front of structure in wall fall
40083	B3 23B6-3-3	*Attalea cohune* endocarp, *Psidium guajava* fruit	M8-2	Midden west of structure
40084	B108 22B42-3-4	*Zea mays* cupules, dicot fruit	M7-32	Center back room on floor

Table 10.2. Aguateca Plant Remains by Taxon.

TAXON	COMMON NAME	PARTS FOUND	TOTAL SAMPLE WEIGHT (g)	ASSOCIATED STRUCTURES
Pinaceae				
Pinus sp.	pine, pino, ocote, huhub	charcoal	0.06	M7-22, M8-4, M8-8, M8-13
Dicots				
Anacardiaceae				
Anacardium occidentale	cashew, marañón	charcoal, branch	0.18	M7-22, M8-4
Annonaceae				
Annona sp.	custard apple, anona, 'oop	cotyledon, exocarp	0.09	M7-22, M8-4
Bignoniaceae				
Crescentia cujete	calabash, jícara, hom	rind	0.01	M8-8
Boraginaceae				
Cordia alliodora	salmwood, laurel blanco, b'ojom	charcoal, fruit	0.61	M7-22
Burseraceae				
Protium copal	copal, pom	charcoal	41.8	M8-8
Clusiaceae				
Clusia sp.	matapalo, chunuup	charcoal	0.03	M7-32
Curcurbitaceae				
Curcurbita sp.	squash, calabasa, ix b'ulut'	rind	3.16	M8-4, M8-8, M8-13
Fabaceae		seeds, seed coat	13.55	M8-4, M8-8
Haematoxylon campechianum	logwood, palo tinto, ix tiintoj	charcoal	0.12	M8-4
Leucaena sp.	wild tamarind, guaje, b'ayniiyoj	seeds	9.17	M8-8
Phaseolus sp.	bean, frijol, b'u'ul	seed	0.01	M8-4
Hardwood		charcoal, stem	179.74	M7-22, M7-32, M8-4, M8-8, M8-13
Lauraceae		charcoal	0.01	M8-8
Persea americana	avocado, aguacate, 'om	cotyledons, pits	6.28	M7-34, M8-4

Table 10.2. (cont'd.) Aguateca Plant Remains by Taxon.

Taxon	Common Name	Parts Found	Total Sample Weight (g)	Associated Structures
Malpighiaceae				
Byrsonima crassifolia	wild cherry, nance, chi'	pit, seed	0.07	M7-34, M8-8
Malvaceae				
Gossypium hirsutum	cotton, algodón, tämän	fiber	2.21	M7-22
Moraceae				
Ficus sp.	wild fig, higo, aj chäk	seed	0.01	M7-34
Myrtaceae				
Psidium guajava	guava, guayaba, pichi'	fruit	27.56	M8-2, M8-4
Portulacaceae				
Portulaca sp.	purslane, verdolaga, ix b'erd'olaagaj	seed	0.01	M7-22
Sapotaceae				
Manilkara zapota	sapodilla, chico zapote, ya'	charcoal	4.29	M7-22, M8-4
Pouteria sapota	mamey, zapote, ix chäkä, ja'as	seed coat, charcoal	5.64	M7-34, M8-8
Solanaceae				
Capsicum annuum	chile pepper, chile, 'ik	seed	0.07	M7-34, M8-4
Sterculiaceae				
Theobroma cacao	cocoa, cacao, kakaw	seed	0.36	M8-4
Monocots				
Agavaceae				
Agave sp.	agave, henequen, kij	stem, leaf	0.91	M7-34
Araceae				
cf. *Syngonium podophyllum*	arrowhead, consuelda, ix pegapeegaj	seed	0.02	M8-4
Arecaceae				
Acrocomia aculeata	coyol, tuk'	endocarps	1.12	M8-4
Attalea cohune	cohune, tutz	endocarp, exocarp, fibers	1.28	M8-13, M7-34, M7-22, M8-4, M8-2
Bactris sp.	huiscoyol, jawakte	endocarp	0.01	M8-13
Poaceae				
Zea mays	corn, maize, ixi'im	cupules, disseminule, kernels, meal	43.26	M7-22, M7-34, M7-32, M8-8
Unknown		tissue, leaf impression, stalk, charcoal, disseminule, organic concretion, seed, seed coat	1.31	M7-32, M7-34, M8-4, M8-8, M7-22, M7-32, M8-4
Spermatophyte		tissue	0.22	M7-34, M8-4, M8-8, M8-13

contexts: Structure M8-4 (House of Mirrors) and Structure M8-8 (House of Axes). Most of the pine charcoal remains were retrieved from activity surfaces (floors) and, in one case, from inside a ceramic vessel (M8-4). These contexts suggest that the pine wood might have been used as fuel or as a component of ceremonial activities. It seems less likely that it was used as structural material. This coincides with functions for pine seen at La Milpa (Hammond et al. 2000) and Xunantunich, where pine was interpreted as an imported commodity associated with ceremonial activities in high status and religious contexts (Lentz et al. 2005). Morehart et al. (2005) described the ritual use of pine in caves in the Belize Valley. Pine may have been valued in ceremonial activities because it produces prodigious amounts of smoke when it is burned, particularly when combined with copal, a type of incense used by many groups of Mayan-speaking peoples. This sort of impressive display involving large volumes of smoke is an important aspect of modern Maya rituals. Pine splints are used as torches by the Tzotzil Maya, and wood from the tree is used in many curative rituals (Breedlove and Laughlin 2000). The context of archaeological pine at Aguateca suggests that its pattern of use for torches and as a component in ceremonial activities parallels ethnographic observations and reports from other Maya sites.

Anacardiaceae (Cashew family)

Evidence for cashew (*Anacardium occidentale* L.) was found as charcoal in several contexts in Structure M7-22 (House of Masks) and Structure M8-4 (House of Mirrors). Cashew, a fruit tree native to the Amazon Basin (Mitchell and Mori 1987), was introduced to Central America in Precolumbian times. Because it is not native to Central America, the cashew find undoubtedly represents a domesticated tree crop rather than a wild forest species. Elsewhere in Mesoamerica, evidence for cashew has been reported from Formative period deposits at the Cuello site in Belize (Miksicek 1991) and from the Yarumela site in Honduras (Lentz et al. 1997). Even though we do not have evidence for the fruits at Aguateca, the fact that wood is present indicates that the fruit tree was being exploited. Modern Central American cashew cultivators begin harvesting fruit within four years of planting, continue for another twelve years, and then cut down the trees and replant (Popenoe 1920). After an orchard is cleared, the wood can serve other purposes, as it is moderately hard and has a lustrous surface quality; it is easily worked and is suitable for carving with stone tools (Standley and Steyermark 1949). This reuse of orchard products explains how the wood may have been incorporated into the activity areas of the site. Although the roasted seeds are most familiar to North Americans and Europeans, the fleshy fruit (or hypocarp) is of great interest to Central Americans as a source of a sweet wine called *vino de marañón* (Williams 1981). We have no specific evidence from Aguateca that confirms the use of cashew as a fermented beverage, but it is hard to imagine that this obvious attribute was overlooked by the ancient Maya.

Annonaceae (Annona Family)

Fragments of annona (*Annona* sp.) fruits and cotyledons were found in Structure M7-22 (House of Masks) and Structure M8-4 (House of Mirrors), royal and subroyal contexts, respectively. This genus consists of about nine species, all with edible fruit, that are indigenous to Central and South America. The presence of spines on the exocarp indicates that the species represented at Aguateca was guanabana (*Annona muricata* L.). Although the fruits are the most attractive aspect of the tree (Williams 1981), it has many other uses as well. The wood is used in house and artifact manufacture; the bark is a source of cordage; the leaves can be used for dye or as a source of tannin; and the seeds, when crushed, serve as a vermifuge (Williams 1981). The discovery of fruit and seed parts suggests that the Aguateca inhabitants were mostly interested in the edible fruits.

Bignoniaceae (Trumpet Vine Family)

Fragments of calabash (*Crescentia cujete* L.) rind were found on the floor of the north room in Structure M8-8 (House of Axes), an elite residence. Although today the seeds of the fruit are often made into a popular Central American beverage called *horchata* (Williams 1981), the context and the presence of the rind indicate that the fruit was being used as a gourd-like serving vessel, perhaps as a cup or bowl.

Boraginaceae (Borage Family)

Burned wood fragments (Figure 10.1) of salmwood (*Cordia alliodora* ([Ruiz & Pav.] Oken) were found in a dense organic deposit next to the westernmost room of Structure M7-22 (House of Masks). Salmwood is a forest tree whose wood is suitable for construction and fine woodworking (Standley and Williams 1970). The leaves have medicinal applications in the treatment of insomnia, coughs, diarrhea, and other ailments (House et al. 1995). Also, the trees have beautiful flowers and are planted as ornamentals in dooryard gardens throughout Mesoamerica. The salmwood sample at Aguateca was found in wall fall of the palace and appears to have been associated with the termination ritual. It is not clear, however, whether this represents construction material from the palace structure or material taken from other contexts.

Burseraceae (Balsam Family)

Burned copal wood (*Protium copal* [Schltdl. & Cham.] Engl.) was found in the center room of Structure M8-8 (House of Axes), an elite domicile near the Aguateca causeway. Copal is a tree of moist forests and may have been protected, if not cultivated, in the area around Aguateca because it is highly prized as a source of incense derived from the resin, or sap (Standley and Steyermark 1946a). Copal incense is an essential component of modern Maya rituals and religious ceremonies (Williams 1981; Lentz and Dickau 2005). It seems likely that the wood, which can be used much like the pure resin, was a component of ceremonial activities at Aguateca.

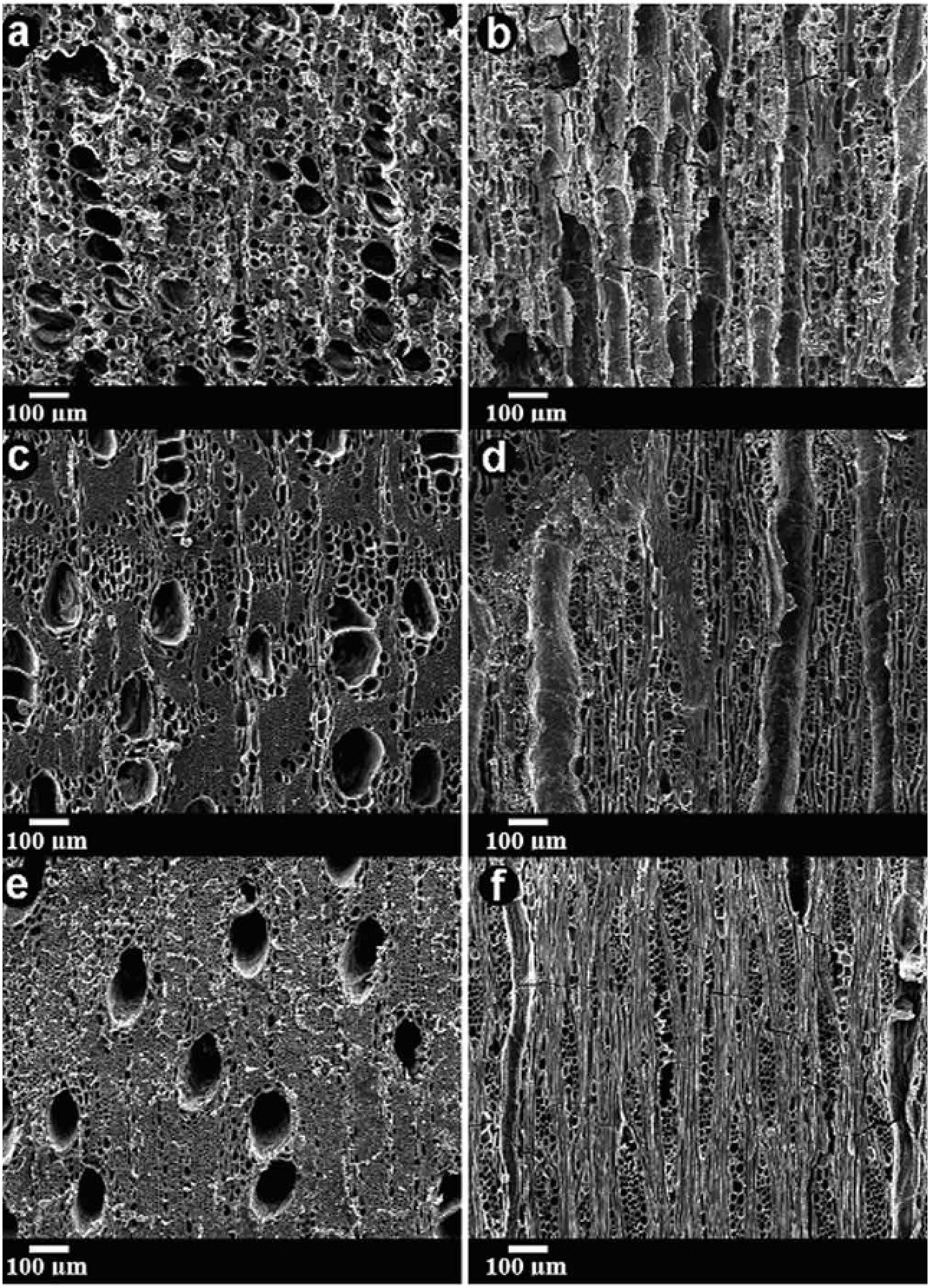


Figure 10.1. Electron micrographs of charcoal from Aguateca. (a–b) *Manilkara zapota*. (a) Transverse section. (b) Tangential section. (c–d) *Haematoxylon campechianum*. (c) Transverse section. (d) Tangential section. (e–f) *Cordia alliodora*. (e) Transverse section. (f) Tangential section.

Clusiaceae (St. John's-wort Family)

Burned wood from a matapalo tree (*Clusia* sp.) was found in the termination ritual deposit over the broken niche of the center room bench in Structure M7-32 (House of Bones) of the royal palace. Matapalo, as the Spanish name implies, is a strangler that grows on other forest trees, initially for support but eventually enveloping and replacing the host tree. The latex of *Clusia* is used to treat toothaches; the bark can be made into baskets; and the wood is used for fuel, fence posts, and other purposes (Standley and Williams 1961). The matapalo charcoal found in the termination ritual deposit quite possibly was used for fuel during the ritual.

Cucurbitaceae (Squash Family)

Squash (*Cucurbita* sp.) was the second-most common of the annual field crops (next to maize) at Aguateca, appearing in seven contexts (or 8 percent of the total analyzed). Fragments of squash rind were recovered from the floor in the north room of Structure M8-4 (House of Mirrors), the south addition of Structure M8-8 (House of Axes) near a storage vessel, and the center room on the floor north of the bench in Structure M8-13, a smaller residence next to Structure M8-10 (House of the Scribe). Squashes are among the principal food crops of the present-day Maya (Breedlove and Laughlin 2000; Williams 1981), and that pattern of food use evidently is what is represented by the squash remains at Aguateca.

Fabaceae (Legume Family)

The charcoal (Figure 10.1) of logwood (*Haematoxylon campechianum* L.) was found on the floor of the House of Mirrors (M8-4) in the south room. Logwood, or *palo tinto* as it is known in Guatemala, is a small tree that is common along the banks of Lake Petexbatun and in swamp forests called *tintales*. The wood is a source of black dye that has been used since Precolumbian times. It is also a source of astringent for treating dysentery and diarrhea (Standley and Steyermark 1946a). Beams made from this wood, which are very strong and durable, were used in the construction of palaces and two of the major temples at Tikal (Lentz and Hockaday 2009). Logwood was most likely used as construction material at Aguateca as well, but uncertainties in the context at the site prohibit a definitive interpretation.

Numerous seeds of wild tamarind, or *guaje* (*Leucaena* sp.), were found on the floor in the center room of Structure M8-8. Guaje is a tree of tropical deciduous forests and second growth in lowland areas. One species, *Leucaena leucocephala*, is cultivated by the modern Tzotzil Maya (Breedlove and Laughlin 2000). The seeds are edible but alternatively serve as a source of medicine and, if ingested in high quantities, poison (Balick et al. 2000). The wood can be used in house construction and for firewood (Breedlove and Laughlin 2000). Judging by the contexts examined, the Aguateca occupants probably were consuming the seeds.

One broken cotyledon from a bean (*Phaseolus* sp.) was unearthed in Structure M8-4 (House of Mirrors), a residence occupied by an elite household. The bean was in or next to a Pantano Impressed jar (WVS No. 23A-11, Cat. 310301) located on the floor of the front porch connected to the north room. Jars of this type were mostly used for carrying or storing liquids. If the bean was actually inside the vessel before it was crushed, it may have been soaking in water with numerous other beans or in dry storage for a subsequent meal. Another possibility would be that the vessel contained *atolli*, a beverage made from ground maize that is often flavored with beans (Coe 1994). The fact that only one bean was found, rather than a large number, favors the atolli interpretation. This part of M8-4 is believed to have been used for food storage and preparation (Volume 1:Chapter 3), so it would not be unexpected to find beans in storage or in a vessel containing atolli in this context.

Lauraceae (Laurel Family)

Avocado cotyledons (*Persea americana* Mill.) were discovered in Structure M7-34 (a possible communal feasting house) and on a bench in the south room of Structure M8-4, an elite residence. Avocado is native to Guatemala and Mexico, and evidence for this cultivated plant is common at other archaeological sites in Mesoamerica: for example, Copan, Cerén, Cuello, Wild Cane, Tikal, Pulltrouser Swamp, Colha, Albion Island, and Santa Leticia (Lentz 1999). In addition to the widely known edible fruit, the tree has other uses. The seeds can be used as a pesticide, the bark is a source of dye, the rind serves as a vermifuge, and oil from the fruits can be used for cosmetic purposes (Standley and Steyermark 1946b). From the context of the avocado remains at Aguateca, it seems most likely that the fruit was being consumed as a foodstuff.

Malphigiaceae (Barbados-cherry Family)

Nance pits (*Byrsonima crassifolia* [L.] DC) were found on the floor of a possible communal house (Structure

M7-34) and near a vessel on the floor of the south addition of Structure M8-8, an elite residence. Nance is a small tree native to the neotropics and is found in moist or dry thickets below 1500 m in elevation. Sometimes it grows in pine-oak forests, but often it is cultivated for its small but juicy, pungent fruits that can be eaten fresh or made into an alcoholic beverage. The wood or bark of the nance tree is a source of tannin, red dye, and a treatment for diarrhea (Standley and Steyermark 1946a). Because pits were found, the consumption of the nance as fresh fruit or beverage component is indicated.

Malvaceae (Mallow Family)

One of the most interesting plant finds was a fragment of textile with a simple weave of Z-spun threads fused to the bottom of a mass of carbonized organic material (Figure 10.2f). A loosely knit cloth made of cotton fiber (*Gossypium hirsutum* L.) was found on the floor in front of the bench of the easternmost room, a sealed storage room in the royal residence (Structure M7-22). Cotton, a Mesoamerican cultivar, was used not only as a fiber source; evidently, the seeds were used as a source of cooking oil, as seen at Cerén (Lentz et al. 1996b). At Aguateca, we have evidence only for the use of cotton fiber.

The textile was associated with kernels of maize. This is a unique find and begs closer examination. First, the textile seems too thin to be a carpet or floor covering. It looks as if a cluster of shelled maize kernels was set on a cotton cloth, perhaps in a bag or wrapping. This is not a typical method of storage. The Yukatek Maya of the Puuc region use either crib or bin structures for long-term storage of maize (Smyth 1991). The most effective technique is to store the ears without removing the protective husks. This is a common practice today throughout Central America. At the Cerén site, long-term storage was achieved by placing ears of maize, with their husks removed, in bins made of *Titonia rotundifolia* (Mill.) S. F. Blake tied with agave twine. Such bins were located in bodegas or storage sheds. Shelled maize was placed in utilitarian ceramic vessels for short-term storage. Thus, the textile with shelled maize kernels was probably not a typical mode of storage, just as the location, at the foot of the bench in the royal palace, suggests an unusual circumstance. Possibly the maize was intended as part of an offering designed to propitiate the gods or was the meal of someone returning from or anticipating travel.

Cotton remains at other Precolumbian Mesoamerican sites, such as Cerén in El Salvador (Lentz, Aguilar et al. 1996), Chichen Itza in Mexico (Lothrop 1992), and Cahal Pech in Belize (Wiesen and Lentz 1999), also have been identified as *Gossypium hirsutum*, a species of cotton native to the Yucatan Peninsula. Cotton textiles of manufacture similar to the Aguateca bag have been found at other Maya archaeological sites in contexts that suggest ceremonial associations. The Cenote of Sacrifice at Chichen Itza, tombs at Río Azul (Carlsen 1987), and activity surfaces at Barton Creek Cave in Belize (Morehart et al. 2004) all contained the same kind of cotton cloth, presumably in association with ritual activities.

Moraceae (Mulberry Family)

A seed from a wild fig tree (*Ficus* sp.) was found in the center room of the communal house (Structure M7-34). Figs are large trees that grow along streams and in moist forests (Standley and Steyermark 1946b). The fruits are edible; the juice from young fruits is used as a dye; and the latex or sap is used as an anthelmintic (Lentz and Dickau 2005). Although this fig seed was found in the wall fall, it most likely was among the plant remains associated with the activity surface debris.

Myrtaceae (Myrtle Family)

Guava fruits (*Psidium guava* L.) were found in several contexts at Aguateca. This small native tree of Mesoamerica has been cultivated since Precolumbian times and is often grown by the Maya today (Breedlove and Laughlin 2000). The fruits can be eaten fresh or made into preserves; the wood is used for fuel and as a source of tannin. Decoctions of the leaves have been employed as an astringent or as a remedy for diarrhea (McVaugh 1963). Carbonized fruits were discovered inside a ceramic vessel (an Encanto Striated jar [WVS No. 23A-50, Cat. 310381]) located in front of a bench in the south room of Structure M8-4 (House of Mirrors), an elite residence, and in a midden to the west of Structure M8-2. These contexts indicate that the fruits were being consumed fresh by the elite.

Portulacaceae (Purslane Family)

A purslane seed (*Portulaca* sp.) was found in the easternmost room of the royal residence (Structure M7-22) under wall fall. *Portulaca* is a genus of wild, herbaceous plants that grow as weeds in agricultural fields and in waste places. Although they are not normally cultivated, they have many uses: the aromatic leaves can be used as a potherb or as a treatment for snakebite, and the seeds are edible but are generally regarded as food for livestock (Lentz and Dickau

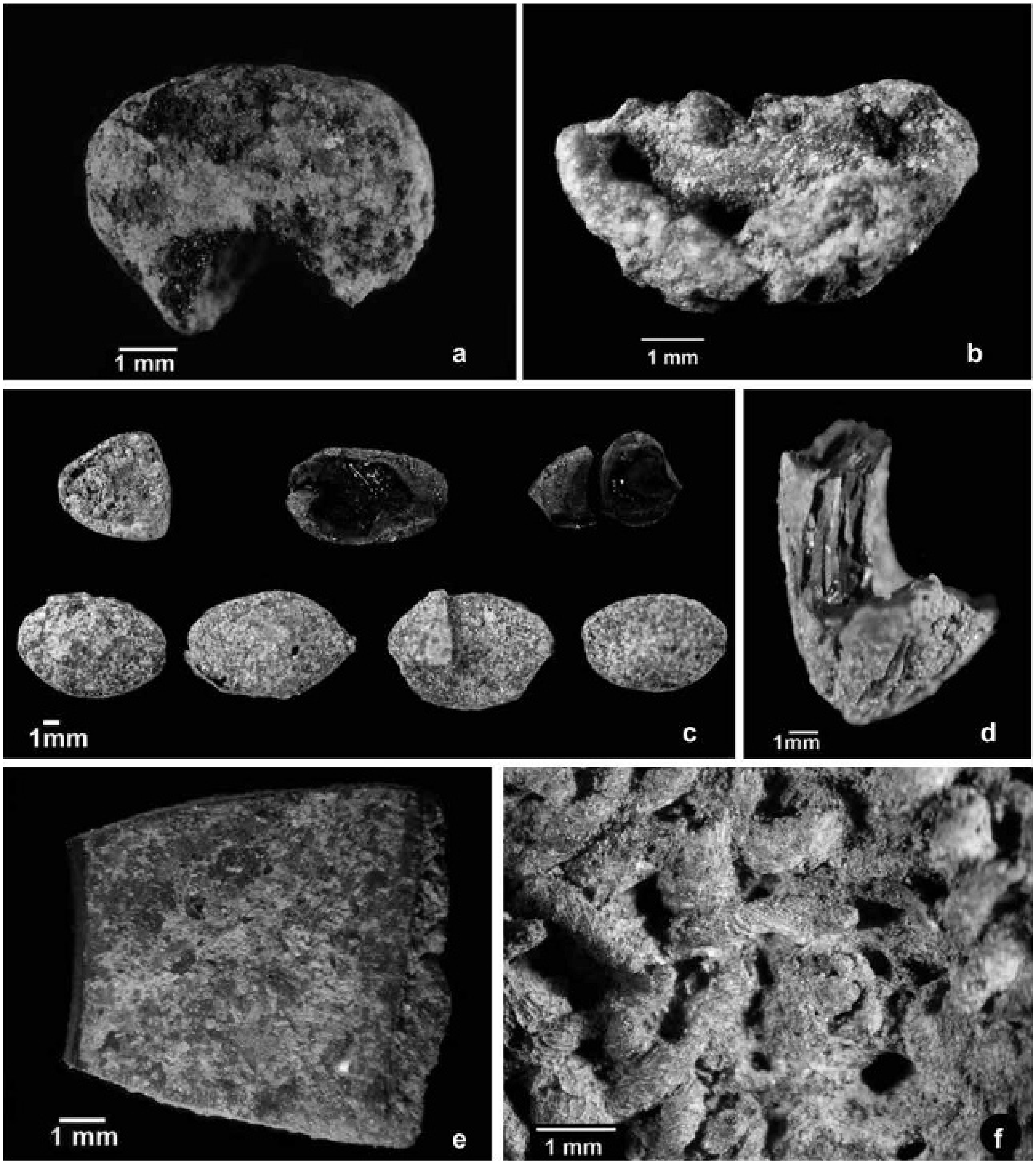


FIGURE 10.2. Paleoethnobotanical remains from Aguateca. (a) Zea mays kernel from Structure M7-22. (b) *Zea mays* cupule from Structure M7-22. (c) *Leucaena* sp. seeds from Structure M8-8. (d) *Theobroma cacao* seed from Structure M8-4. (e) *Pouteria sapota* seed coat from Structure M8-8. (f) A close-up of cotton (*Gossypium hirsutum*) fibers made into a bag found in Structure M7-22.

2005; Standley and Steyermark 1946b). The context of the seed suggests that it may have been an accidental inclusion or perhaps, because it was in a context with maize, was being used as a famine food.

Sapotaceae (Sapodilla Family)

The burned wood of sapodilla (*Manilkara zapota* [L.] van Royen) was found on the floor in front of the westernmost room of the royal residence (Structure M7-22) and on the floor of the north room of an elite residence (Structure M8-4). Sapodilla, a dominant tree species of the upland forest, was the wood of choice for the construction of palaces and temples at Tikal (Lentz and Hockaday 2009). Judging from the contexts described above, a similar pattern of use is indicated at Aguateca.

Both the burned wood (Figure 10.1) and the seed coats from the fruit of the sapote tree (*Pouteria sapota* [Jacq.] H. E. Moore & Stearn) were unearthed from several contexts. Sapote is native to the region and grows in moist forests and along streams. It is commonly cultivated for its delicious fruits, but the tree is valued for other reasons, too. It is a source of latex, medicine, poison, and construction material (Balick et al. 2000). The seeds, which emit a mild almond-like aroma, are a source of rich oil (Standley and Williams 1967). The fruits can be made into a sweet wine (Bruman 2000). Sapote charcoal was found in the wall fall of the east front room of the royal palace (Structure M7-22), possibly as part of the termination ritual deposit. The seed coat fragments were found on the floor of an elite residence (Structure M8-8), in an adjacent exterior area, and in front of the bench in the communal house (Structure M7-34). The wood most likely was being used for construction material, and the fruits were being consumed fresh and perhaps made into wine at Aguateca. These multiple uses and contexts of sapote illustrate a key feature of fruit trees: after their fruit-bearing years are over, they often end up as construction material or fuel for the hearth.

Solanaceae (Nightshade Family)

Capsicum annuum L., or chile pepper, seeds were found on the floor of Structure M7-34 and inside or next to a Pantano Impressed jar (WVS 23A-11, Cat. 310301) in front of the north room of Structure M8-4. Peppers originated in the neotropics, probably in the semiarid cerrado region south of Amazonia (Andrews 1992). Today the plants are cultivated by most Maya groups and are commonly grown in dooryard gardens rather than in milpas (Breedlove and Laughlin 2000). The contexts with chile peppers at Aguateca indicate that the peppers were being consumed as a foodstuff. The association with the Pantano Impressed jar is of special interest because these vessels were generally used for liquids. The peppers, along with the bean mentioned above, may have been part of a flavoring for *atolli*. The Yukatek Maya would grind or simply soak young maize kernels in water and lime until the kernels dissolved. Oftentimes this mixture was allowed to sour, and then it would be boiled to sweeten the flavor (Coe 1994:138). Beans and chiles were common additives to the beverage, and this may be the explanation for the presence of these cultigens in association with a vessel designed for liquid storage. In support of this interpretation, the vessel shows signs of burning that probably resulted from the cooking process.

Sterculiaceae (Cacao Family)

A burned cacao (*Theobroma cacao* L.) seed (Figure 10.2) was unearthed from the floor of an elite residence (Structure M8-4, House of Mirrors). Cacao is native to South America and was introduced to Mesoamerica in Precolumbian times (Standley and Steyermark 1949). The Maya, however, probably deserve the culinary credit for inventing the beverage made from the roasted seeds (Coe 1994). The Aguateca cacao seed was located in a room (the north addition of Structure M8-4) believed to have been used for food preparation and storage. The cacao seed indicates that the nobility were still able to enjoy luxuries, such as chocolate, despite the threat of attack.

Although it seems odd, cacao seeds are rarely found at Maya archaeological sites. The reasons are twofold: first, the seeds were highly prized and would not have ended up in the trash very often, and second, they have convoluted cotyledons that tend to break into tiny pieces when carbonized, so they crumble with the slightest physical action. The sudden disturbance followed by conflagration undoubtedly contributed to the preservation of cacao at Aguateca.

Agavaceae (Agave Family)

The stems and leaves of agave (*Agave* sp.) were recovered in front of the bench in the center room of the communal house, Structure M7-34 (House of Metates). There are many species of agave in Mesoamerica, all producing usable fibers, and many are a source of food and alcoholic beverages (Bruman 2000).

Araceae (Aroid Family)

The seed of an arrowhead plant (*Syngonium podophyllum* Schott) was found inside a Manteca Impressed jar (WVS 23A-2, Cat. 310393) in the north room of an elite residence (Structure M8-4). This vessel is most likely designed for the storage of food. The arrowhead plant is a vine of moist forests that produces edible fruit (Standley and Steyermark 1958). The context at Aguateca suggests that the fruits, probably gathered from a mature forest setting, were being stored for later consumption by elite residents.

Arecaceae (Palm Family)

Coyol (*Acrocomia aculeata* [Jacq.] Lodd. ex Mart.) endocarps, the hard, inedible layers of the fruit, were found on the north addition floor of an elite residence (Structure M8-4). The kernels of coyol can be eaten fresh, the sap can be made into wine (Breedlove and Laughlin 2000), and coyol palm "cabbages" are edible (Williams 1981). The sap has several medicinal applications (Orellana 1987), and it appears that the palm was cultivated by the ancient Maya at Copan (Lentz 1990). The coyol in M8-4 may have been part of a food processing operation in which the edible kernel was being extracted from the rest of the fruit.

Fruits from the cohune palm (*Attalea cohune* Mart.) were found in numerous contexts at Aguateca, including the midden west of Structure M8-2 and in a food storage or preparation room in an elite residence (Structure M8-4). Cohune is a palm of lowland forests and grows abundantly in the Petexbatun region. The kernels are an excellent source of oil, wine can be made from the sap, the trunks can be used for construction, and the leaves make excellent thatch and mats (Standley and Steyermark 1958). The remains of cohune endocarps clearly demonstrate that the fruits of cohune were being consumed at Aguateca.

Huiscoyol (*Bactris* cf. *major* Jacq.) was found in the center room on the floor in front of the bench in a lower-status elite residence (Structure M8-13). Huiscoyol kernels are edible but somewhat acidulous and not as substantial as the other palms mentioned above (Williams 1981). It is a plant of low wet areas that are common in the landscape around Aguateca. Judging by its location in Structure M8-13, the huiscoyol was probably being consumed as a food item.

Poaceae (Grass Family)

Maize (*Zea mays* L.), represented mainly by kernels, cupules (Figure 10.2), and stalk fragments, was the most ubiquitous species found at the site (recovered from 19 [23 percent] of the samples analyzed). Maize was one of the main cultigens, if not the principal staple, of the ancient Maya. According to Diego de Landa, the early-contact Maya consumed maize as a "bread" (tamales or tortillas) or one of several kinds of beverages described as *posolli* (a sour dough mixed with water), atolli, *pinolli* (made from toasted maize), and maize-based beer (Coe 1994). The maize finds at Aguateca could have been the result of processing for any of these food preparations.

DISCUSSION

The plant remains and their contexts at Aguateca provide grist for an intriguing mill of discussion. The agricultural assemblage suggested by the archaeological plant remains parallels discoveries at other Maya sites from the Classic period, but the Aguateca collection is unique because the inventory of plants used is extensive, the plants within the site were left in situ, and we have a good understanding of where the various plants were cultivated or collected.

In terms of sustenance, several contexts at Aguateca reveal clusters of plant remains found in locations that indicate where food preparation, consumption, and related activities took place. In the communal house (Structure M7-34, or House of Metates), numerous plant materials, including agave stems, sapote seeds, a fig seed, maize kernels, avocado pits, nance pits, and pepper seeds, suggest that food consumption, possibly "feasting" activities, occurred in the central room, similar to those described by Brown (2001) at the Cerén site.

In the north room of Structure M8-8 (House of Axes), squash and maize remains were found adjacent to what was left of a calabash serving vessel. These remains were located next to a metate, other grinding stones, storage jars, and serving vessels. Likewise in the south addition, nance pits, squash rinds, sapote seeds, and maize kernels were adjacent to storage jars and grinding stones. Both contexts indicate that storage and food preparation activities occurred in these rooms.

The north room of Structure M8-4 (House of Mirrors), contained metates, manos, storage vessels, beads, a flute, stone tools, and spindle whorls. The plant evidence there included cacao seeds, anona seeds, chile pepper seeds, squash rinds, coyol fruits, and a *Syngonium podophyllum* seed. Also found in the southern and central rooms of M8-4 were maize kernels, guava fruits, and avocado pits, all important food items. The artifacts and plant remains found in two rooms at M8-4 signify that these were work spaces functioning, at least in part, as food preparation and storage areas that reflect a diverse assortment of foods processed in a domestic setting.

The paleoethnobotanical record reveals a wide variety of carbohydrate sources that could have been employed in the likely event that feasting activities, especially those centered on the consumption of alcoholic beverages, took place at Aguateca. Maize, common at Aguateca, is the principal constituent in a variety of alcoholic drinks. It is the sole ingredient in the production of a beverage known as *chicha*, which is made by first chewing the kernels and then letting the masticated mass ferment (Bruman 2000). Another alcoholic beverage, called *sendechó*, is fermented maize flavored with chile. Several of the fruit trees found at Aguateca were potential sources of sweet wine, including nance, cashew, guanabana, sapodilla, and sapote (Williams 1981; Bruman 2000). Also, the sap of two of the palms found at Aguateca, coyol and cohune, can be used to make wine. Various species of agave have been made into alcoholic beverages, mostly by baking or roasting the root. *Balche*, a favorite beverage of the Lacandon and other Maya groups, has as its main ingredients honey and the bark of *Lonchocarpus punctatus* Kunth., which are combined with ground maize and cornstalk juice mixed with sweet agave sap (Bruman 2000). Two out of the four plants needed for balche were represented at Aguateca. Thus, if feasting activities took place at Aguateca and alcoholic beverages were part of those activities, there was no shortage of ingredients from which intoxicating beverages could have been prepared.

Maize was the traditional staple of the Maya and was heavily consumed throughout the Classic period. In terms of ubiquity at Aguateca, maize was by far the most common archaeological plant. Based on isotopic signatures of the soils around Aguateca, the areas most likely to have been used for maize agriculture were the nearby *bajos* (seasonal wetlands) and *rejolladas* (natural karst depressions) (Wright et al. 2009). All of the accessible bajo areas and most of the rejolladas were located outside the Aguateca fortifications. Upland areas, including those close to defensive walls, exhibit relatively weak indications of maize cultivation. In view of these findings, it appears that the residents of Aguateca relied heavily on agricultural fields outside the fortifications for their supplies of maize. Because of the Mesoamerican pattern of growing the field cultigens together, other annual crops such as beans and squash were probably grown outside the defensible zones as well. The outlying annual crop fields must have remained accessible at Aguateca, however, even though they appear to have been in a vulnerable location. As Inomata (1997) argues, the threat against Aguateca during the Late Classic period did not concern land control; rather, the focus of aggression was the political position held by the center's ruling elite. In other words, the fields and the crops were not the targets of invading foes. The political structure, represented by the central precinct, was the target, and needed to be protected. Under this scenario, crops from outfields could have been harvested normally and brought into the site core on a routine basis.

Because the carbon isotopic data in the site core indicate low levels of C_4 plant enrichment and because of the numerous tree crops represented in the paleoethnobotanical collection, it seems reasonable to hypothesize that the structures in the site core were surrounded by orchards. Evidence for the fruits of avocado, calabash, sapote, nance, guava, annona, and cacao was recovered from a variety of contexts. In addition to the dicot fruits, several palm fruits were present at the site: huiscoyol, cohune, and coyol. The ancient Maya were ardent palm users; we find substantial evidence for palm use at Copan (Lentz 1990), Xunantunich (Lentz et al. 2005), Dos Pilas (Lentz 1999), Cahal Pech (Wiesen and Lentz 1999), and other sites (McKillop 1994). Palms are easy to grow, produce abundant calories, mostly in the form of oil, and require little care; they are an excellent resource for a society with a burgeoning population and limited land for agriculture. The variety of fruit trees was undeniably a significant addition to the Aguateca diet.

It would have made perfect sense for the inhabitants to grow as many useful trees as possible inside the walled portion of the polity. This pattern of growing fruit trees within and adjacent to household groups and other building complexes, with or without the threat of attack, seems to have been a common practice among the ancient Maya, as it is today among the modern Maya. Not only would the trees have been a valuable source of food and other products, but they would have provided shade during the blistering heat of the Central American dry season, a considerable benefit.

The Cerén site in nearby El Salvador, because of its inundation and preservation by a volcanic eruption, provides a useful point of comparison. At Cerén there was direct evidence, in the form of plaster casts made from voids in the volcanic ash, that numerous fruit trees, such as guava, cacao, avocado, and nance, were grown directly adjacent to and within the house compounds (Lentz, Beaudry-Corbett et al. 1996; Lentz and Ramírez-Sosa

2002). The Cerén residents propagated an orchard system within easy reach of the domiciles, where fruit trees could be fertilized with household waste and night soil, and harvests could be protected from scavenging animals.

The range of fruit tree species in evidence at Aguateca indicates that arboriculture was an important aspect of the agricultural output. Paleoethnobotanical evidence tells us what kinds of trees were planted in orchards at Aguateca, and the stable carbon isotopic data (Wright et al. 2009) indicate that C_3 plants, for example orchard trees, were grown next to the house compounds, similar to the pattern observed at Cerén. More specifically, the small rejolladas within the walled compounds would have been suitable for the production of cacao (Dunning et al. 1997), one of the many tree fruits identified among the paleoethnobotanical remains at Aguateca.

The concept of numerous fruit trees growing in the immediate confines of the inhabited area of Aguateca also matches the observations of Spanish chroniclers in early postcontact times. They recorded that the Maya villages of Yucatan were filled with fruit trees. Because many of the fruits from these trees were used to make alcoholic beverages, the Spanish deemed it appropriate to raze the orchards to eliminate a source of temptation (Coe 1994). The stable carbon isotope data, the ethnographic accounts, and the clear contextual information from other archaeological sites in the region all support the assertion that the occupants of Aguateca planted orchards adjacent to their house compounds.

Numerous other hardwood tree species—*Cordia alliodora*, *Manilkara zapota*, *Pouteria sapota*, *Protium copal*, *Clusia* sp., and *Haematoxylon campechianum*—were recovered from Aguateca as well. Of these, *Manilkara*, *Clusia*, *Protium*, and *Pouteria* were trees of the tropical forest and would have grown predominantly in the upland areas (Dunning et al. 1997) as wild, managed, or even cultivated forests or as components of the infield orchards. *Manilkara* and *Pouteria* both produce edible fruit and today are cultivated by various Maya groups (Williams 1981). It has been hypothesized that *Manilkara zapota* grew in protected areas at Tikal (Lentz and Hockaday 2009), and the same practice may have been employed at Aguateca as well.

H. campechianum is a tree of the bajos and swamp forests along the shores of Lake Petexbatun. The presence of these tree remains at Aguateca indicate that there was exploitation, and possibly even management, of the nearby bajo resources during the Late Classic period in addition to the maize agriculture in the bajos described above.

The pine charcoal at Aguateca is a provocative discovery because the area around the site is an amalgam of tropical deciduous and swamp forests, not a place where pine trees are found, at least not today. During the Late Classic period, pine wood probably came from one of two sources. One possibility is that it may have grown in the vicinity in the past. If the Maya had cleared the land repeatedly and shortened their fallow cycles excessively, then Caribbean pine could have gotten a foothold in upland areas that were badly degraded (Perry 1991). In this scenario, pine may have grown close enough to Aguateca for wood foragers to return home with it in a reasonably short period of time.

Alternatively, pine may have been a traded commodity in the form of processed charcoal obtained from more remote areas, such as the Maya Mountains or Alta Verapaz, where it grows in natural stands and could have been transported down the Pasión River and its tributaries. As noted above, there is an expanding body of evidence, both ethnographic and archaeological, that pine was used by the ancient Maya in ceremonial activities. As such, it would have had a premium value, making it a suitable trade item. Also, fuel must have become scarce by the end of the Late Classic period, as human populations in the Maya Lowlands expanded exponentially (Turner 1990). One way to adjust to the need for fuel and ceremonial paraphernalia, especially for the elite, was to develop an exchange in this useful and scarce item.

Conclusions

The botanical remains found at Late Classic Aguateca reveal important insights into the dietary intake, agricultural production, and agroforestry practices of the elite occupants during a time of political upheaval. Maize was the most common food item recovered, followed by squash, peppers, and a variety of tree fruits.

The elite Aguateca inhabitants apparently had a varied, if not abundant, diet. In fact, it is remarkable that the scope of the food available seems so complete, and were it not for the other signs of calamity, the dietary intake appears substantial, with a few exceptions. The large number of guaje seeds, the wild purslane seed, and the near absence of common beans provide some indication that famine foods were being used, even among the elites. We have few samples from commoner households at Aguateca, so an understanding of any inequality of dietary consumption among socioeconomic strata, as observed at Copan (Lentz 1991), must await further study. Notwithstanding the lack of subsistence data for the lower echelons of society, the dietary diversity for the elites is impressive and runs parallel to the stable isotope paleopathology data found at other sites in the Pasión region (Wright 1997), which indicate balanced nutrition and a lack of diet-related diseases among the elites in the region during Late Classic times. It appears evident that even at the height of political turmoil at Aguateca, there was a diversity of cultivated food items and a variety of alcoholic beverage sources available to the elite for day-to-day consumption and even feasting activities.

Cultivation of maize and other annual crops seems to have taken place outside defensive walls in rejolladas and seasonal bajos, as evidenced by the stable carbon isotopic signatures. Upland areas near the site show weak $\delta^{13}C$ enrichment, suggesting that these areas were not used for long-term maize agriculture (Wright et al. 2009). Moreover, stable carbon isotope data retrieved from the bones of white-tailed deer (*Odocoileus virginianus* Boddaert) collected from archaeological deposits at Aguateca and Punto de Chimino indicate that over 75 percent of the diet of the deer came from C_3 plants, which suggests a stability in local forest resources (Emery et al. 2000). Thus it seems that the upland areas were not exploited extensively for maize-centered crop agriculture. Alternatively, at least some of these areas may have been set aside as forest reserves where management and silviculture could have been regularly practiced to promote the production of essential resources. Within the immediate vicinity of the house compounds, it seems likely that orchards combined with multicropped home gardens proliferated, similar to what has been described previously as an "artificial rainforest" (Wiseman 1978). Wiseman, however, suggested that tree crops and maize could be grown together, but this is not what is indicated at Aguateca. The major annual crops of maize, beans, and squash were grown in one microniche while the tree crops were grown elsewhere. Wiseman also includes breadnut, or *ramón* (*Brosimum alicastrum* Sw.), as part of his model, but there is no evidence that this tree was used at Aguateca.

The overall landscape pattern described for Aguateca corresponds loosely to Fedick's "managed mosaic" (1996), in which a variety of microenvironments are exploited for different kinds of fine-tuned agricultural production. We see wetlands being used at Aguateca for annual crop cultivation, areas next to the site core being used for orchard production, and tropical semi-deciduous forest areas being managed intensively for the maintenance of trees of economic value. The model presented here is perhaps somewhat generalized, and undoubtedly the actual agroforestry and agricultural pattern at Late Classic Aguateca had many exceptions; nevertheless, the overall pattern we have described is supported by several converging lines of evidence.

In summary, the calamitous end of the occupants of Aguateca left favorable conditions for the preservation of plant remains. Excellent preservation coupled with a meticulous excavation strategy helped to provide a rich data set for archaeological plant analysis. When combined with isotopic evidence, the paleoethnobotanical results offer a rare glimpse into the agricultural practices, agroforesry approaches, and food use activities of a Late Classic Maya center.

chapter 11

Artifact Conservation

Harriet F. Beaubien

From the outset of investigations by the Aguateca Archaeological Project, principles of conservation guided decisions at all stages of the archaeological process, influencing practices from excavation through laboratory processing, as well as approaches to artifact, architectural, and landscape investigation and post-excavation site management. The volume and scope of the excavated finds, however, highlighted the need for an active conservation program addressing the requirements of these collections.

Beginning with the 1998 field season, artifact conservation became an active component of the project's activities, through a collaboration between the Aguateca Archaeological Project and the Smithsonian Institution's Museum Conservation Institute (MCI).[1] My initial site visit that year gave me an opportunity to gain information about the specific conditions of the site, the archaeological goals, the range of excavated materials, and field procedures in order to identify the key conservation issues and plan for the conservation team's participation during the subsequent study phase. Minor conservation treatments of a range of excavated materials were carried out as part of the assessment process to test suitable conservation methods and to stabilize and pack selected items in preparation for the excavated finds' transport to Guatemala City at the conclusion of excavations in May. At the time of the visit, several fragile and badly fragmented artifacts were unexpectedly discovered and thus received initial conservation while in situ, a fortuitous field intervention with surprising consequences (discussed in the section on ceramic laminates below). In general, however, the approach taken by the archaeological team in the field was careful artifact recovery, basic washing (unless specifically deferred), and labeling, as well as packaging for safe transport to the project's facility in Guatemala City following the excavation phase. This facility provided a secure setting, amenities, and space to accommodate conservation, analysis, and documentation activities, in addition to storage for all excavated material transferred from the field.

From 1998 through 2002, conservators joined the team during the project's laboratory-based sessions, with primary responsibility for conservation of high-priority items or those with more complex problems, including artifacts intended for museum display.[2] The staff managed the conservation areas and an inventory of conservation supplies and reference materials for use by seasonal and year-round team members, and contributed technical expertise to the research effort. Among the tools and supplies, acquired locally or brought from the United States, was a bench-mounted stereobinocular microscope with camera attachment to assist the full range of laboratory activities.

Within the Aguateca Archaeological Project, the artifact conservation effort was shouldered not only by the Smithsonian participants but also by the archaeological team members. Keenly attuned to the issues of preservation and responsible curation, they quickly adopted approaches and practices in their work with the artifact inventories, ably handling the bulk of the ceramics reassembly and preparation of the collections for eventual transfer to the Instituto de Antropología e Historia de Guatemala (IDAEH). As an information resource for the team, the conservators offered demonstrations and practical training on a range of topics, including basic materials and methods of archaeological conservation, such as artifact lifting and reconstruction techniques; casting plaster fills for ceramics; taking impressions; and fabricating customized housings for artifact storage. Several planned exhibitions featuring Aguateca material provided occasions to discuss packing issues, display environments, and aesthetic approaches to loss compensation. Advice and some assistance with the collections' conservation issues were also extended to team members from other archaeological projects.

CONSERVATION APPROACHES

Condition Issues

An artifact's material aspects hold particular interest for the information they retain about building-block compounds and raw materials; about life history, including fabrication processes and evidence of use; and about the circumstances of deposition. The primary focus of conservation is the preservation of these fundamental features in ways that protect physical and chemical integrity, enable technical study by elucidating and making accessible these important aspects, and promote long-term stability by addressing risks of damage presented by storage or display environments.

For archaeological materials, conservation typically involves mitigating the sometimes severe effects of burial. At Aguateca, the rapid abandonment of the site core without subsequent occupation resulted in deposits with a shallow soil overburden and protective forest cover, albeit disrupted by roots; with the ample percolation of moisture, clayey carbonate-containing accretions covered most artifacts. Typical in this environment, the surviving materials were primarily inorganic, whether mineral or of biological origin, such as ceramics, stone, and bone. These are relatively robust from a chemical and physical standpoint but were vulnerable to the destructive events leading to abandonment of the site—notably burn events and building collapse. Many items were badly fractured and further altered by heat exposure, usually evidenced by darkening or other color alteration of fragment surfaces, and sometimes permanent deformation (warping and springing) from the heat. Although damaging, the special depositional circumstances also favored more complete artifact preservation and recovery, including evidence of materials that survive archaeological burial poorly if at all, such as organics. As a result, conservation actions had a role to play in every phase, from field recovery to laboratory finds processing, including analysis and technical interpretation, to curation, whether on display or in storage.

Guiding Principles

In selecting conservation methods and materials to achieve the preservation goals, the conservators followed principles central to current conservation practice. A non-invasive approach, in which the original is not materially changed, was favored whenever possible; it included an emphasis on diagnostic examination, a minimalist approach to handling and cleaning, nondestructive analysis, provision of protective supports and housings in both storage and display settings, and establishment of environmental controls to maintain the object's stability.

Materials adversely affected by archaeological burial, however, often benefited from or required some level of intervention. When treatment was appropriate, the approach taken was a minimalist one—doing the least necessary to achieve a result that met research needs and permitted the material to regain and remain in a stable state over the long term. Conservation products, selected for treatment or housing applications, had known composition and met high performance standards, being well tested for their effects on original materials, their inertness and stability over time, and their reversibility, if removal is necessary. They were materially compatible and appropriate for the particular application and did not inhibit or interfere with further conservation or instrumental analysis to the greatest extent possible.

More extensive treatment was considered suitable when it served a carefully articulated didactic or research function, such as filling areas of loss in order to reconstruct form or decoration. Such interventions were distinguishable with close inspection, and the principle of reversibility was particularly important. In all cases, documentation of individual treatments, both before intervention and with details about actions and materials used, was a critical aspect of conservation. Since these actions may result in changes of appearance or composition, the documentation added information potentially significant to those conducting research using these materials.

All conservation actions and effects were carefully considered in advance, but the strategic choices were not made in isolation. The balancing of perspectives about what to preserve and how to achieve it were routinely promoted within the Aguateca Archaeological Project by ongoing discussion and by team collaborations, in both the archaeological and conservation processes.

Treatment Methods

Specific methods used by the conservators are described below, and the conservation products used in treatment and housing applications are identified briefly by name and compositional type.

Cleaning

Most of the Aguateca finds were washed on site by the archaeological team, using toothbrushes to remove soil and accretions, except for artifacts determined to be fragile or sensitive. These were brought back to the lab unwashed so that they could be cleaned under more controlled circumstances, in some cases by a conservator. The water available in the field camp and in Guatemala City did not appear to have a problematic soluble salt content and could be used safely for cleaning most materials, although bottled or filtered drinking water was typically used in the laboratory setting. For fragile or sensitive materials, dry methods of cleaning were favored, using an aspirator (blower bulb) and fine soft paintbrushes, with thin bamboo picks or a scalpel used to remove accretions with magnification (microscope or head-mounted Optivisor). For sensitive materials that could tolerate some wetting, a faster-evaporating ethanol or ethanol/water mix was used, thus limiting moisture introduction. For a limited number of ceramics and ceramic laminate fragments (tested in advance), an extremely dilute acid treatment applied locally with a swab was somewhat successful in rapidly removing stubborn carbonate-containing residues without requiring brushing. Precautions, including prewetting the area with water to limit the cleaning action to the surface and rinsing repeatedly with water to remove acid residues after treatment, were critical. This method was not recommended for ceramics with sensitive painted decoration that could be damaged easily.

Consolidation

Because of surface sensitivity or structural weakness, some materials could not be handled or reassembled safely without some form of consolidation. A consolidant is typically a very dilute form of an adhesive that penetrates readily; an acrylic resin (Rohm & Haas's Paraloid B-72), diluted in acetone, was routinely selected for this purpose and applied by brush. Most consolidation—to strengthen fragile material and, as a standard practice, to prepare break edges of fragments for joining—was carried out in the lab, but on occasion the archaeological staff consolidated fragile surfaces on site.

Reassembly and Gap Filling

The recommended procedure for reassembly was to locate the positions of all fragments by laying them out first and then to join them, several at a time, in a progressive sequence, typically from base to rim, so that accurate alignment could be easily maintained. For routine reassembly, fragments were adhered with Paraloid B-72 adhesive, once break faces were cleaned and well consolidated. However, because this adhesive can begin to soften slightly at very high ambient temperatures, potentially affecting joins with too much glue or parts that are flaring and heavy, it was generally used only for nonload-bearing joins. For joins requiring greater strength, a related acrylic resin with a much higher softening temperature (Paraloid B-48N) was used for reassembly, also in acetone solutions.

Structural strength was also improved by selectively filling gaps from missing fragments. Original surfaces in contact with the fill material, such as break edges, were always consolidated first, to strengthen them and to allow the fills to be removed more easily at a later time, if necessary. For ceramics, fills were either cast in plaster of Paris or modeled using a putty made from the acrylic resins, bulked with glass microballoons (a fine inert powder produced by 3M). Once dry, both varieties can be carved or sanded to shape. For display purposes, the fills were toned using reversible paints, either watercolors (Winsor & Newton) or acrylic emulsion (Liquitex) paints. Generally, fills were articulated to distinguish them from the original areas—for example, slightly recessed from the surface and with a lighter tone—while still visually integrating the object.

Support

When added support was desirable to reinforce weak material or to hold joined components together during the course of treatment, one useful method was to attach a temporary facing (on the front surface) or backing (on the reverse). These were composed of small patches or strips of tissue, which were adhered across the breakage seam or fragile area. A very fine strong Japanese tissue paper, adhered with a cellulose ether gel that dries to a light, easily reversible adhesive (e.g., Dow's Methocel, Hercules's Klucel), produced a closely conforming support that could be readily removed at a later time with water or alcohol. Stronger support was provided by using a nonwoven tissue made of polyester (Reemay) or nylon (Cerex), adhered with dilute B-72 adhesive. This was also added as reinforcement for tissue backings to make them more durable.

For several particularly fragile items, closely conforming but removable solid supports were custom-made to provide added protection during lifting, handling, and storage. An epoxy putty (Phillyseal R) was shaped in a thin

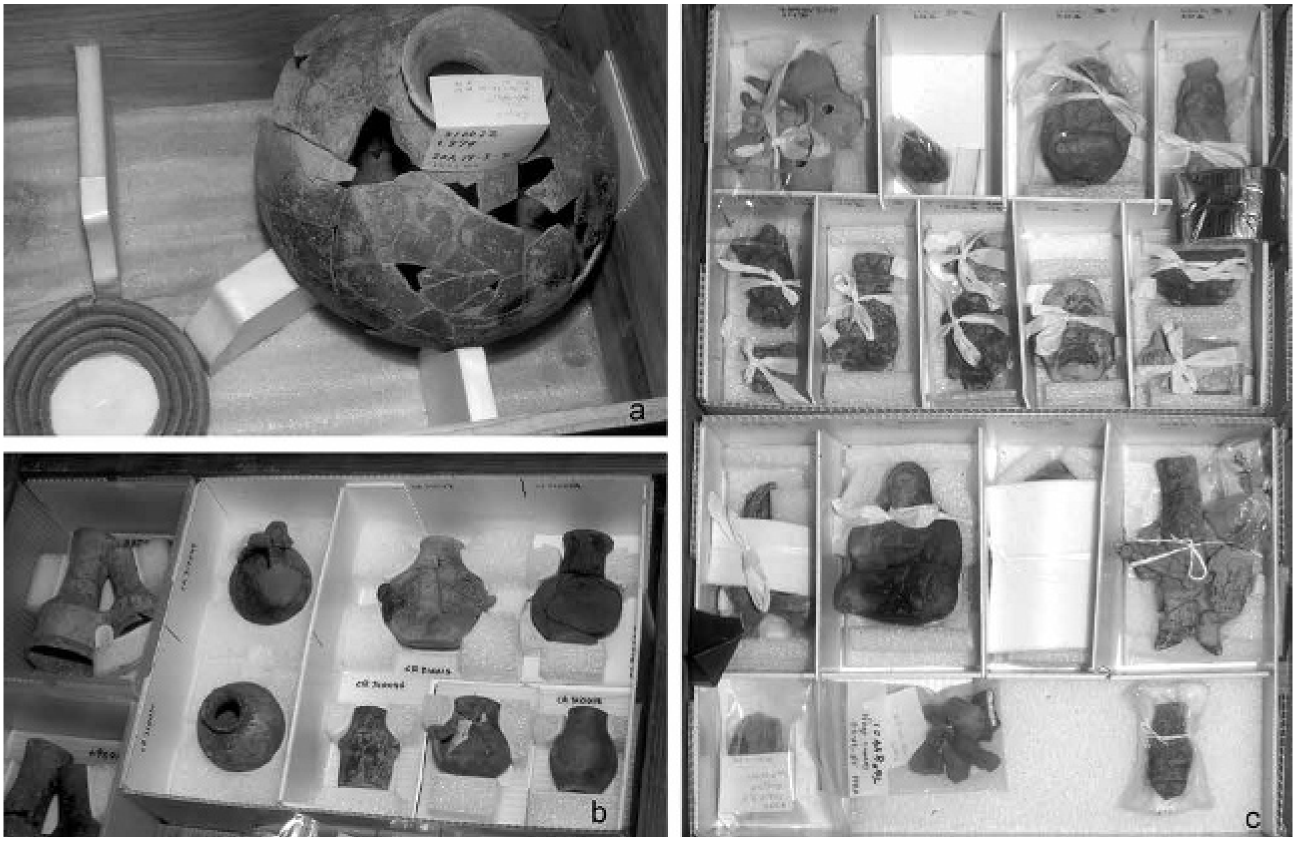


Figure 11.1. Storage supports and containers fabricated for artifacts. Not to scale. (a) Reconstructed ceramics, with vessel 20A19-3-3, Cat. 310022, in position. (b–c) Small ceramic artifacts.

sheet and, with an intermediate barrier film (such as plastic wrap or aluminum foil) to prevent irreversible staining of or adhesion to original materials, pressed against the surface to be cradled. Once cured, it formed a thin, rigid, and strong support, which was then attached to the artifact with easily reversible methods.

Housing and Storage

Provision of protective enclosures for storage was considered fundamental to the long-term preservation of all artifact collections. Tyvek (inert polyolefin paper) bags were used by the project in the field as a substitute for paper-based bags. Particularly for the storage of sherds, these were ideal because of their stability and resistance to wetting, while still allowing residual dampness to evaporate.

Once the artifacts were in the lab, field packaging was replaced as needed, except for sturdy bulk items, for which Tyvek bags were appropriate. Individual artifacts were provided with appropriate mounts or containers made of conservation-grade products. Cotton wool used in packing was always replaced with inert materials such as foam padding. Sturdy items were stored in good-quality polyethylene self-closing bags, the latter allowing artifacts to be examined easily with minimal handling. For further protection, small items were stored in trays or lidded boxes fabricated from translucent Coroplast (polyethylene/polypropylene corrugated board) and rigid bins made of polyethylene and other stable plastic materials. These were often fitted with cushioned supports made of inert polyethylene foams of various types and thicknesses (e.g., Volara, Ethafoam) (Figure 11.1). Hot-melt adhesive, applied with a glue gun (used only for housing), or Paraloid acrylic adhesives were used to assemble the container components, and nylon ribbon was used if artifacts needed to be secured with ties in their mounts and boxes.

In 2002, various storage configurations were developed in preparation for transfer of the collections to several IDAEH storage destinations: the Museo Nacional de Antropología y Etnografía (MNAE), for special examples of figurines, bone, shell, and ceramics; the Ceramoteca, for ceramic type collections and reconstructible ceramics; and Salon 3, for bulk collections, including ceramics, large groundstone objects, bone, and shell. The conservators' priority was material destined for the MNAE, including items to be stored in boxes or in cabinets (supplied by the Aguateca Project), requiring customized housings, or chosen for exhibits. The Guatemala-based team members completed all remaining storage preparations and oversaw the final transfer of the Aguateca collections.

Artifacts to be stored at the MNAE and Ceramoteca were organized by material type and by operation, with exhibit-worthy items clearly labeled as such. For bin storage, each item in its bag or with customized padding was arranged within modular boxes or trays that stacked within the bin (Figure 11.1b, c). Reassembled ceramics to be stored on the Ceramoteca's open shelving were outfitted with a support, such as a ring constructed of a foam tube, to restrict movement (Figure 11.1a). Recommendations for the shelves included lining them with a thin foam sheet to prevent abrasion and adding belting around the sides, which could be unhooked for easy access, to provide restraint in case of earthquake. Items destined for Salon 3 were also organized by material type and by operation, and stored accordingly in cardboard boxes, arranged on open shelving. Bulk materials were stored in Tyvek bags; discrete artifacts were individually bagged in a plastic bag for visibility and arranged in stacking trays for economic use of space and physical protection within the boxes.

Technical Study

In-depth examination, carried out during the conservation process, frequently revealed technical details of value to the research effort and suggested directions for further investigation using instrumental analytical techniques. To facilitate the study of surface details or to create positives from small ceramic molds, the conservation staff occasionally took impressions using a quick-setting dental impression compound (a Coltène/Whaledent product) (see Figure 7.5b). Areas to be molded were first well consolidated with dilute B-72 in order to protect them from staining by oils in the impression compound and to prevent adherence of the cured material in surface recesses.

Several items, loaned or sampled with IDAEH's permission, were analyzed by Smithsonian conservators at MCI, using a wide range of analytical techniques useful for both inorganic and organic materials. Results are reported in the various sections below.

Documentation

The conservation staff documented all activities daily in a hardbound conservation notebook and in photographs. Summaries of treatments were entered on the individual artifact sheets, generated for all registered objects, by those carrying out the conservation activities. Individual conservation log sheets were filled out for each artifact treated by the conservation staff and could accompany the transferred collections. MCI conservation reports were filed annually, along with periodic technical study reports; versions translated into Spanish were included in the annual research reports submitted by the project to IDAEH. The original notebook, log sheets, slides or digital images, and reports remain part of the Aguateca Archaeological Project's archive, with copies archived at MCI in Suitland, Maryland.

SUMMARY BY MATERIAL TYPE

Ceramics

Ceramic objects—including largely complete vessels, figurines, and other items made of fired clay—were the artifact category requiring the most sustained conservation attention. Although generally sound in their as-found state, they were badly fragmented. The vessels in particular sometimes showed evidence of "springing," a permanent deformation caused by the release of internal stresses, originating from fabrication, at the moment of breakage and often exacerbated by heat. The primary conservation goal for these materials was reassembly for stylistic analysis and for exhibition. In most cases, the sherds had been cleaned in the field, and reconstruction was carried out by team members using standard methods described above. Particularly with vessels, their overall completeness and the number of fragments meant little tolerance for error in the reconstruction, and springing deformations created sometimes difficult dislevels and cracks to be accommodated. If difficulties were encountered, the conservators provided assistance, adjusting joins by softening the adhesive in selected regions using heat from a hair dryer and realigning them with pressure, using a band clamp or heavy rubber bands; or taking apart and cleaning the joins with acetone and redoing them. Notable examples include two jars (Cat. 310051, Volume 1:Figure 8.3; Cat. 310055, Volume 1: Figure 8.18, discussed below) and two incense burners with strikingly modeled faces (Cat. 310050, Volume 1:Figure 8.44; Cat. 310385, Volume 1:Figure 8.46c).

Ceramics with structural problems or conditions too sensitive for standard procedures necessitated more tailored treatment solutions. The polychrome cylinder vessels presented the most problematic surface conditions (Cat. 310042, Volume 1:Figure 8.29d–f; Cat. 310353, Volume 1:Figure 8.15d–h; Cat. 310328, Volume 1:Figure 8.15a), requiring delicate cleaning and light consolidation for protection and to enhance legibility (Figure 11.2a). Those with structural problems were stabilized with fills and other reinforcements, with fills toned for aesthetic integration on objects intended for exhibition (Figure 11.2b, c). Additional examples include a flute (Cat. 23A1604-1, Figure 2.17), a set of three miniature paired drums (Cat. 310264, Volume 1:Figure 9.1a; Cat. 310265, Volume 1:Figure 9.1b; Cat. 310266, Volume 1:Figure 9.1c), a plate (Cat. 310164, Volume 1:Figure 3.11), a small jar (Cat. 310031, Volume 1:Figure 8.20), and a bottle (Cat. 310157, Volume 1: Figure 8.27c).

One of the most challenging was a very large storage jar (Cat. 310055, Volume 1:Figure 8.18; Figure 11.3). The team had begun reassembly of sherds in "islands," which the conservators subsequently integrated, requiring some position adjustments and reinforcement of the major joins using adhered strips on the interior. Newly discovered sherds belonging to this jar were inserted after the conservators selectively softened or undid joins in those areas, and numerous fills made of acrylic putty were added for structural stability during the course of treatment. With the attachment of a heavy shoulder segment, slight separation along several axial joins began to be noted, which was attributed in part to pressure from the vessel's considerable mass on imperfect joins. In these areas, any exposed sherd edges were reconsolidated, the failed adhesive was softened with acetone injections, more B-48 was injected if needed, and the vessel was cinched with a band clamp to squeeze the joins more tightly together until they had dried. For additional structural reinforcement, Reemay tissue strips were adhered with B-48N on the interior in the shoulder areas and at the jar's widest circumference.

The importance of using conservation products of known composition and reversibility was highlighted by a structurally unstable bowl (Cat. 310001, Volume 1:Figure 8.21g) that had been assembled previously using a commercial adhesive without consolidation of the break edges (Figure 11.4). Several joins had failed, damaging the ceramic paste. Tests using a variety of solvents showed that the ceramic fabric would be further damaged by attempts to remove the old adhesive, so only failed joins were redone with B-72. Plaster fills were added to improve overall structure stability and inpainted as part of a training demonstration.

Highly fragmented objects made of unusually thin or friable ceramic required particular time and patience for reassembly, in addition to treatment to improve cohesiveness. Examples include a group of bells shaped like feline heads (e.g., Cat. 23A960-1, Figure 2.19b; Cat. 23A1244-1, Figure 2.19a) and a miniature drum (Cat. 310405, Volume 1:Figure 9.1g) from Structure M8-4.

Ceramic Laminates

Numerous fragments were found by the Aguateca Archaeological Project of an unusual, previously unrecognized material type, which I termed "ceramic laminate" based on its technological features (see Chapter 7 in this volume). Its formation—from multiple layers of woven textile held together by a clay slip matrix, then fired to a temperature sufficient to sinter the clay constituent, burning out the textile component in the process—produced a material that was porous, lightweight, and often very thin (< 2 mm), accounting for its highly fragmented and friable state as found.

Fortuitously, two large clusters of fragments found in Structure M7-22 were still in situ during my 1998 site visit. To prevent further breakage and maintain the relative positions of the fragments as much as possible, we prepared them for lifting as follows. Fragments were gently cleaned using a dry brush and tweezers to remove rootlets, surfaces were consolidated with dilute B-72 by brush, and contiguous fragments were faced with Japanese tissue and a solvent-based cellulose ether gel (Klucel) to retain their relative positions. The less disturbed deposit (Cat. 22A862-1, Figure 7.1b) proved to be in two superimposed layers of fragments, each faced and lifted as described (Figure 11.5a, b). Other fragments were lifted individually but kept in associated groups.

The general treatment approach in the lab, for these and all other fragments of the same material type, was to remove obscuring accretions (when present) using a closely monitored dilute acid treatment that did not damage colored slip applications; consolidate the pieces well; and then reassemble conjoining pieces using B-72, with tissue backings added for support when needed. Tissue facings applied to fragment groups in the field were removed with acetone in order to reposition and rejoin any out-of-place fragments more carefully (Figure 11.5c). New Japanese tissue facings were attached with water-based cellulose ether gel (Methocel) to permit easy removal later without affecting adhesive joins or consolidation.

In the case of the face mask (Cat. 22A862-1), its significance and more complete state of preservation justified a more extensive restoration approach. Acrylic (B-72) putty fills, added to secure vulnerable fragments, were

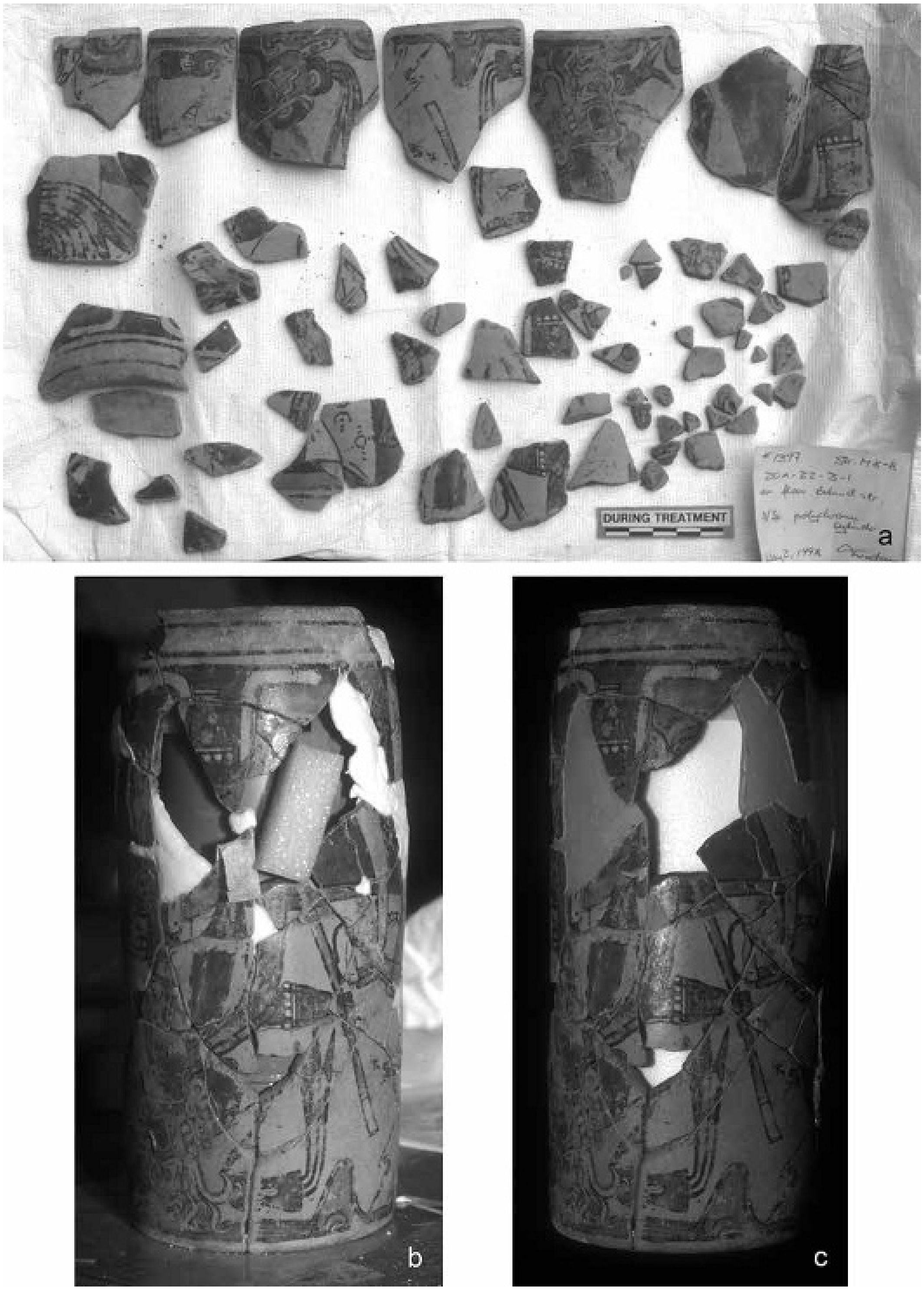


Figure 11.2. Conservation of a ceramic vessel: 20A22-3-1, Cat. 310042. Not to scale. (a) Fragments with sensitive slip, cleaned and organized for reassembly. (b) Addition of structural fills using acrylic putty. (c) Vessel after painting the fills, with white interior support partially visible.

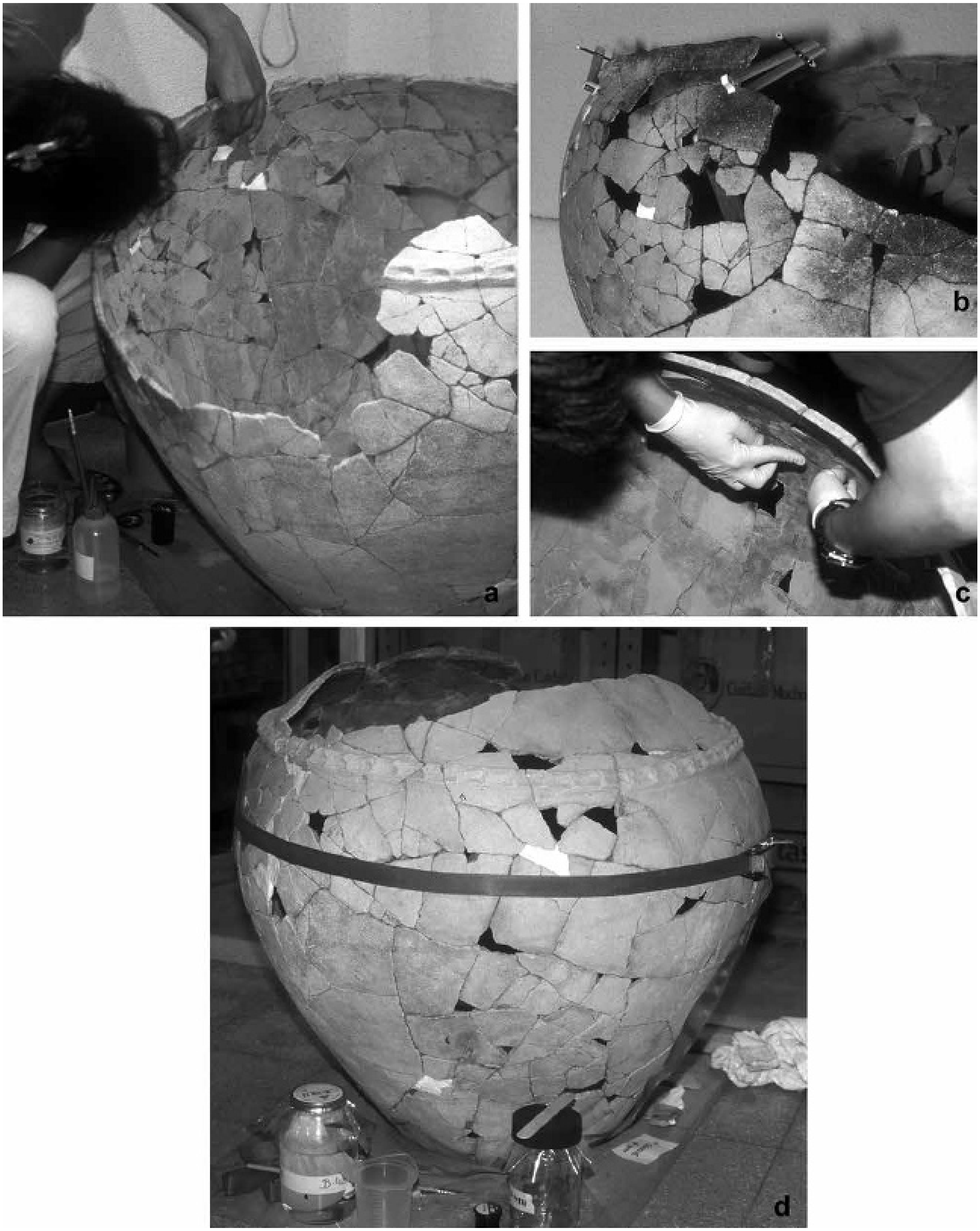


Figure 11.3. Conservation of a ceramic vessel: 20A3-3-1, Cat. 310055. Not to scale. (a) Attachment of fragments. (b) Fragments clamped during adhesive drying. (c) Application of reinforcement backing strips to support weak shoulder region. (d) Use of a band clamp to prevent outward movement of heavy vessel walls during adhesive drying.

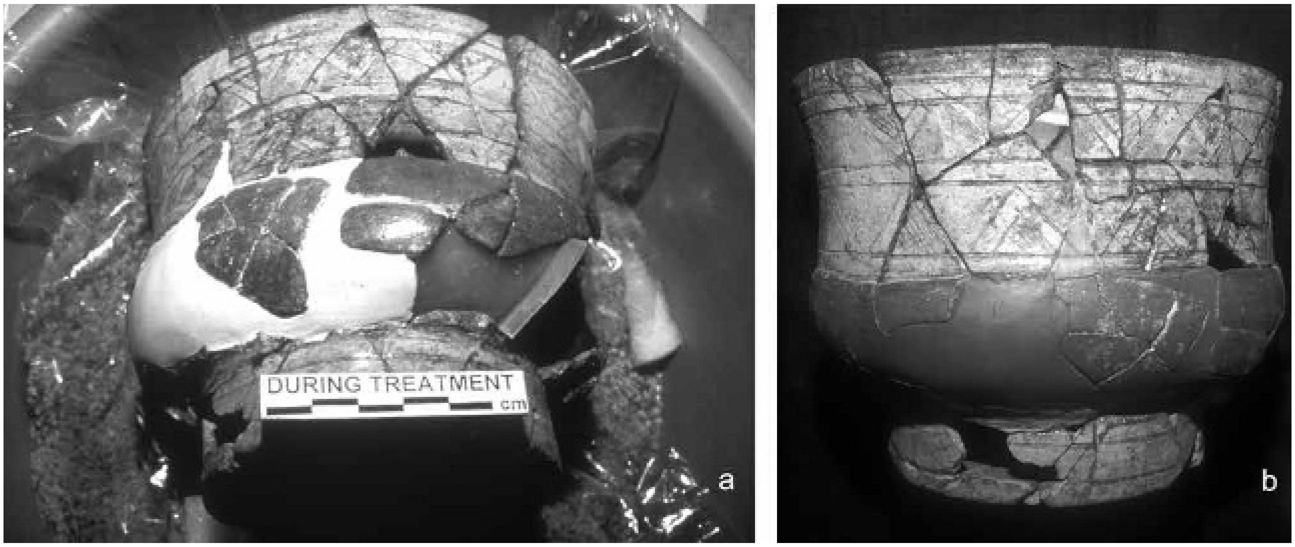


Figure 11.4. Conservation of a ceramic vessel: 20A3-3-2, Cat. 310001. Not to a standardized scale. (a) Addition of structural fills using plaster of Paris, with wax support for new fill in position. (b) Vessel after painting of the fills and surface consolidation.

also fabricated to complete lost portions of the object by extrapolating from extant parts (Figure 11.5d). Tissue backings were reinforced with additional layers of synthetic tissue (Reemay or Cerex) adhered with B-48N for strength (Figure 11.5e). A rigid removable back support was also fabricated using epoxy putty to protect the mask for handling, storage, and a planned display (Figure 11.5f). To attach the support, nylon ribbon tabs, glued at one end to the mask's tissue backing, were threaded through slits cut in the epoxy support and glued down using B-72 adhesive (Figure 11.5g). Finally, the fills were painted with acrylic paints to visually integrate the object for display purposes, and a protective storage box was fabricated for the artifact and associated fragments (Figure 11.5h).

The results of technical investigation—including study of impressions made of the textile imprints, instrumental analysis of selected samples, and laboratory replication experiments—are included in Chapter 7 of this volume.

Stone and Mineral Materials

Stone artifacts could generally withstand water washing and cleaning with a soft toothbrush, unless the material was particularly granular or residue analysis was anticipated. Conservators treated two small dishes, both from Structure M8-4. One, made of sandstone and broken in three fragments (Cat. 23A1459-1, Figure 14.11), was cleaned, consolidated with B-72 for greater surface cohesiveness, and reassembled with B-48N for strength. The other, made of a schist-like stone (Cat. 23A1460-1) that had shattered into numerous lamellar fragments, had been carefully lifted by the field crew to retain the overall shape. The many fragments were cleaned and successfully reassembled with B-72, which could be softened with relative ease to allow adjustment during the process (Figure 11.6). One untreated fragment from the interior was retained for residue analysis and then reintegrated after analysis. Both of these objects were housed in customized boxes for safe storage.

Pyrite, an iron sulfide ore mineral, was found in the form of carefully cut and polished pieces, originally attached to ceramic or stone backings to form mirrors. The components of two stone-backed mirrors from Structure M8-4 (Cat. 23A425-1, Figure 6.25; Cat. 23A969-1, Figure 6.27a) and two ceramic-backed mirrors from Structure M7-22 (Cat. 22A811-1, Figure 6.22), along with numerous detached pyrite fragments, received conservation attention, primarily cleaning with reassembly as needed. In general, the pyrite and backing components were kept separate to facilitate study of ordinarily hidden surfaces.

One of the mirrors, found as a partial object, retained its pyrite pieces, which were held in approximate position to the fragmented backing by soil accretions (Cat. 23A425-1, Figure 11.7a). The components were separated carefully and the stone fragments cleaned and rejoined. After selective sampling of possible adhesive residues (discussed below), the pyrite pieces were cleaned using an ethanol/water mix to limit water exposure and corrosion potential, then realigned and joined, using a temporary backing of Japanese tissue to hold the assemblage together. Later, in preparation for exhibition, the backing was removed, the joins strengthened by adding adhesive into the fragment bevels on the reverse, and then

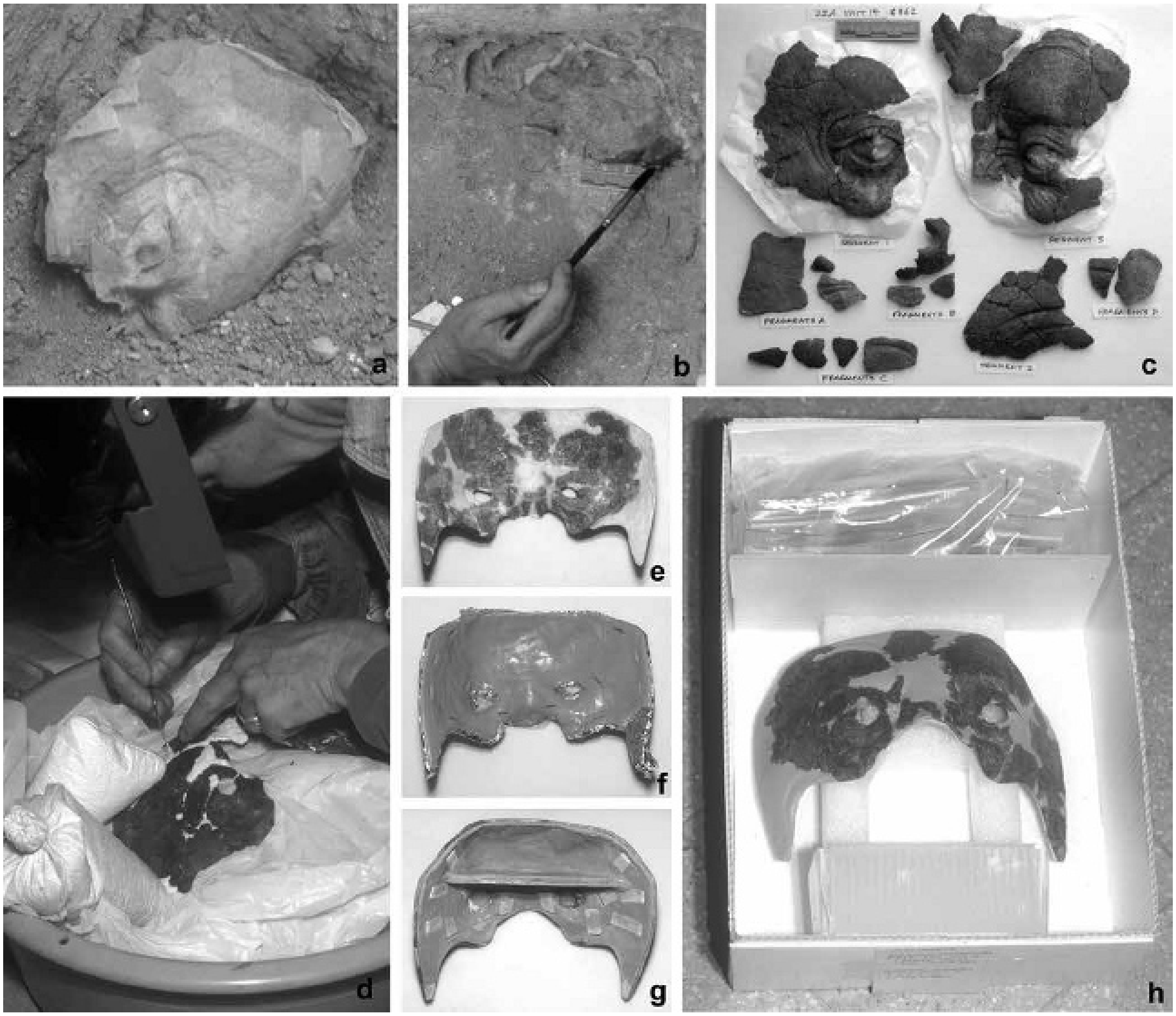


Figure 11.5. Conservation of a ceramic laminate artifact: 22A14-3-3, Cat. 862-1. Not to scale. (a) Upper segment, with tissue facing after surface cleaning and consolidation. (b) Lower segment, during application of tissue backing. (c) Segments with tissue backings, laid out with selected fragments, after cleaning. (d) Mask segments propped for addition of structural fills. (e) Reassembled mask (reverse), with added tissue backing. (f) Mask reverse, with aluminum foil barrier layer and thin epoxy putty application, during fabrication of the mount. (g) Mask reverse, showing mount attachment method. (h) Storage box for the mask and associated fragments.

two layers of Reemay tissue attached with B-72 adhesive (Figure 11.7b, c). Subtle adjustment of the pyrite assemblage's planar surface (using gentle heat) elucidated a slight polishing curve along the mirror's finished edges. This demonstrated that final polishing occurred after the closely fitted pyrite pieces had been affixed to the backing, clarifying an important aspect of fabrication. To provide protection during handling, display, or storage, a removable conforming support in the form of a thin epoxy shell was fabricated and attached using tissue tabs glued to the backing tissue and to the underside of the support with B-72 adhesive (Figure 11.7d).

Analytical investigation was carried out at MCI to investigate various aspects of fabrication and use. Six stone items from Structure M8-4—four chert palettes (Cat. 23A808-1, Cat. 23A1469-1, Cat. 23A1502-1, Cat. 23A2035-1, Figure 14.10), a stone polisher (Cat. 23A1658-1, Figure 14.12), and the fragment retained from one of the dishes (Cat. 23A1460-1, Figure 11.6)—were left uncleaned to retain possible use-related residues. These were analyzed in their as-received condition, both front and back, and again after cleaning, except for the polisher, which was not cleaned. X-ray fluorescence analysis (a nondestructive technique) performed on all the objects yielded no

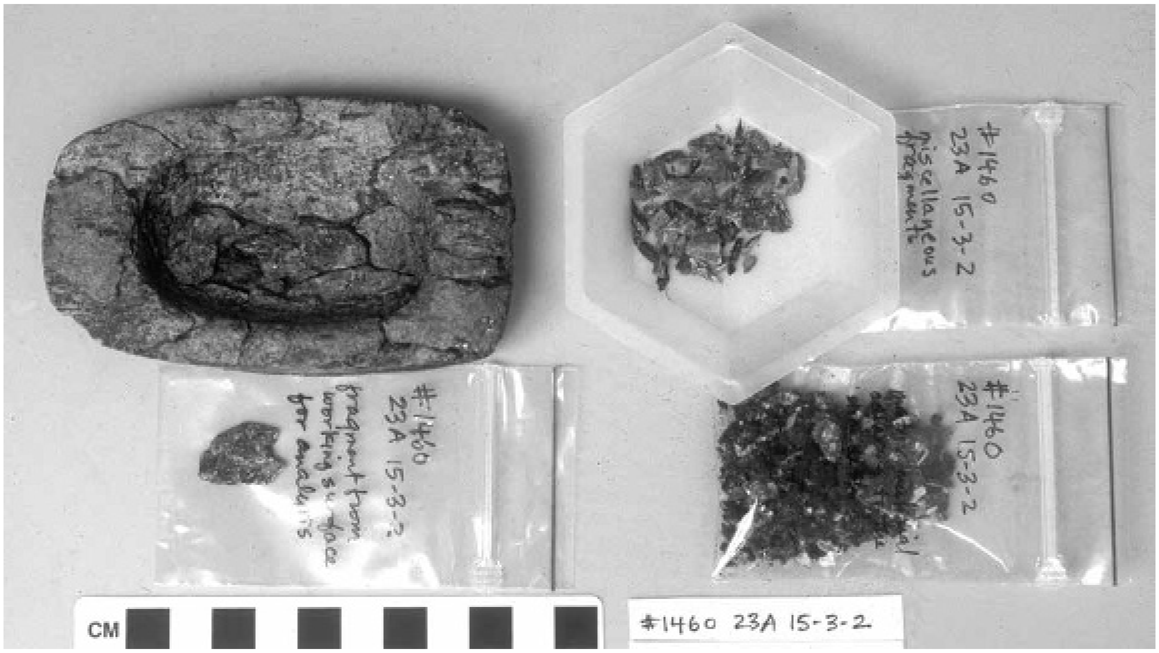


FIGURE 11.6 Conservation of a stone dish: 23A15-3-2, Cat. 1460-1, after reassembly, with piece retained for analysis (prior to reinsertion). Not to a standardized scale.

convincing evidence of pigment preparation on the objects, but a small sample of the residue on part of the polisher was found to be proteinaceous (analyzed further using Fourier transform infrared spectroscopy [FTIR], gas chromatography–mass spectrometry [GC-MS], and high-performance liquid chromatography [HPLC]). Interest in pyrite mirror fabrication extended to the adhesives used to attach pyrite pieces to their backing. Several samples, taken from two stone-backed mirrors (Cat. 23A425-1, Cat. 22B452-1), were analyzed at MCI, using a range of techniques including FTIR, energy dispersive x-ray analysis (EDS), and x-ray diffraction (XRD). Results from the former, primarily compact red-brown material with an organic appearance, were inconclusive, identifying primarily inorganic materials derived from the soil; results from the latter pointed clearly to calcium carbonate, which would have been used in the form of stucco plaster.

Bone and Shell

Both bone and shell objects appear to have been somewhat hardened by heat exposure, although precautions were taken in cleaning because of their inherent sensitivity to moisture; shell in particular can be fragile when excavated, tending to powder or delaminate. An ethanol or ethanol/water mix was generally used for wet cleaning to promote rapid evaporation; this was applied with a soft brush or cotton swabs.

A variety of objects made of bone, including simply worked and decoratively carved items, were cleaned and reassembled; customized housing, using fitted cut-outs and padding, was always constructed to provide additional protection in storage (e.g., Cat. 22A332-2, Figure 13.5; Cat. 22A801-71, Figure 8.5b; Cat. 20A1286-3, Figure 8.10u). Several particularly fragmented and brittle objects also required additional support, including fills and tissue backing strips or layers to reinforce joins. This approach was used on a turtle carapace and plastron (Cat. 20A1345-7, Figure 8.10t) and an elaborately carved bone (Cat. 22A524-8, Figure 13.4). The carved bone warranted additional measures to protect it for exhibition (Figure 11.8). It was strengthened with a number of fills (toned with acrylic paints), several tissue backing layers, and a removable conforming support made of epoxy putty, which fit within the bone cavity. This support was held in place using tissue tabs, as previously described.

Other than several shell ornaments from Structure M7-22, which required only straightforward cleaning, the shell object that received considerable conservation attention was a helmet shell with incised glyphs (Cat. 22A647-10, Figure 13.7), found incomplete and in numerous fragments in the same building. The reassembly effort focused on the carved regions and resulted in five major sections, with several fills modeled in acrylic putty for support (Figure 11.9). A customized housing, using fitted cut-

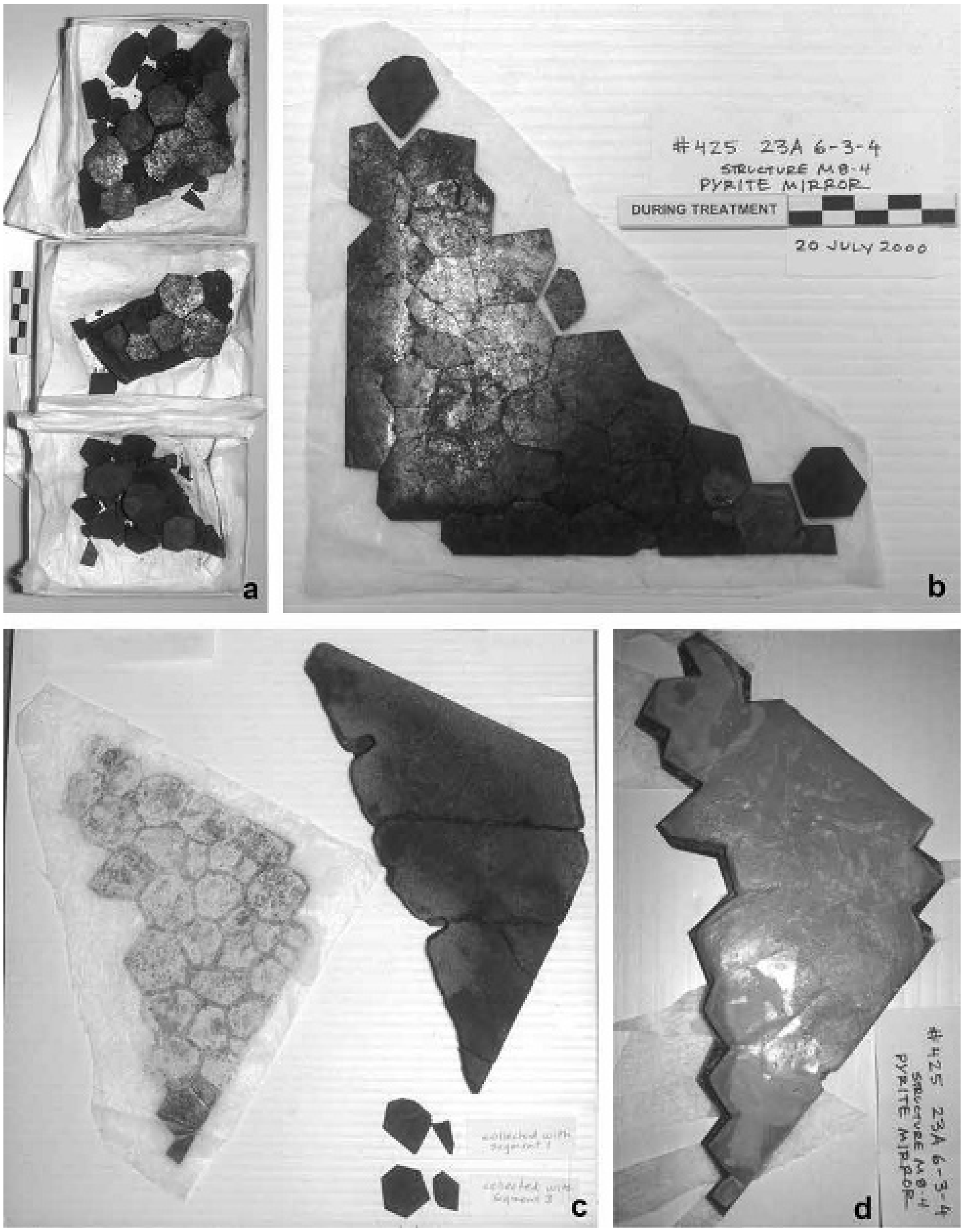


Figure 11.7. Conservation of a pyrite mirror: 23A6-3-4, Cat. 425-1. Not to a standardized scale. (a) Excavated segments before conservation. (b) Pyrite component after reassembly (obverse), backed with tissue support. (c) Pyrite and stone components after reassembly (reverse), with reinforcement support. (d) Pyrite component (reverse), with removable epoxy mount.

outs and padding, was constructed to provide protection in storage as well as access for future study.

CONCLUSIONS

Rapidly abandoned sites offer an extraordinarily complete glimpse of a moment in the past, but with the promise of a comprehensive, well-contextualized data set come added challenges in the archaeological recovery and conservation processes. The Aguateca Archaeological Project actively embraced a conservation ethic in its research program, with the inclusion of conservators on the team and the involvement of all members in ensuring that a stable, well-curated collection was transferred to the national repositories. Participating in laboratory-based sessions each year, the conservators communicated the profession's best practices at each step, while actively addressing the preservation issues of the most at-risk excavated finds as well as those of greatest research value. Integrated

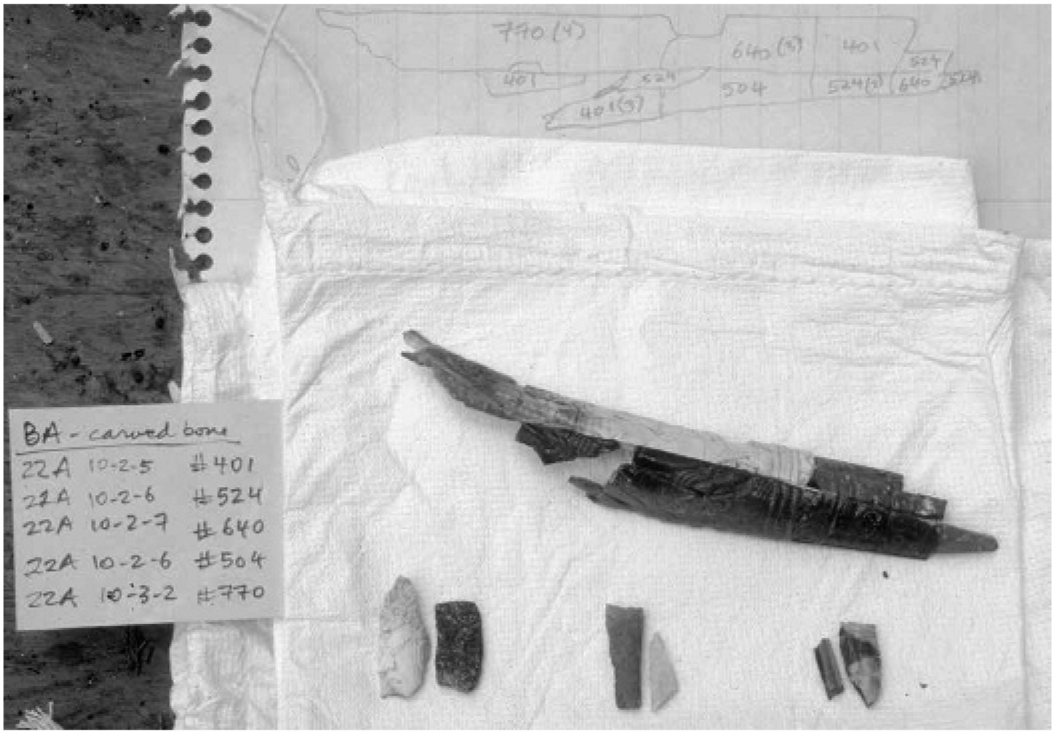


Figure 11.8. Conservation of a bone artifact: 22A10-3-2, Cat. 524-8. Not to a standardized scale. Partial reassembly of fragments, showing color alterations from variable heat exposure after breakage.

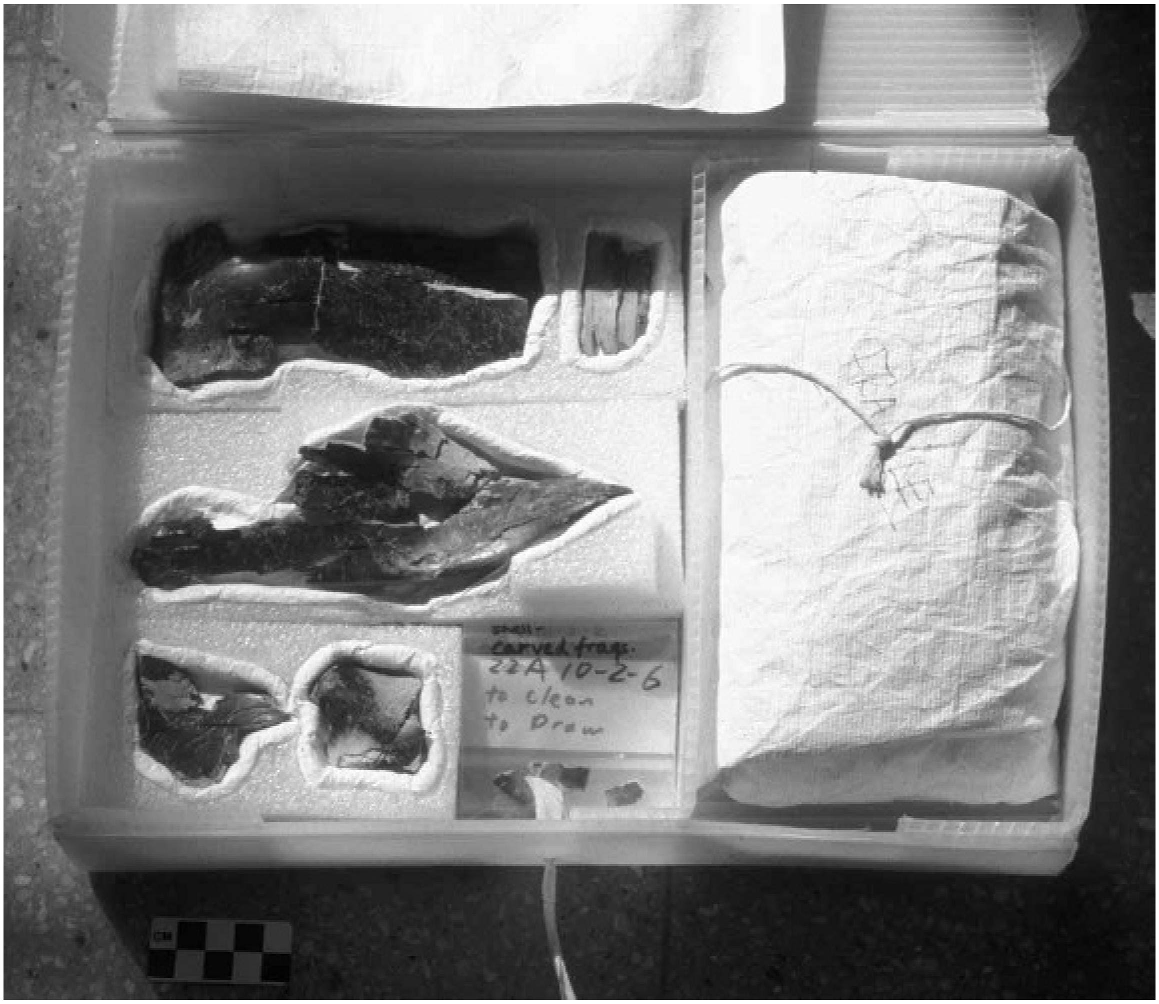


Figure 11.9. Conservation of a carved shell: 22A14-2-6, Cat. 647-10. Not to a standardized scale. Reassembled segments in a custom-made storage container.

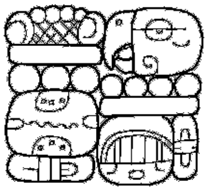
into the project's documentation system for finds, the detailed conservation records offer a further resource for researchers using these finds in their studies. In addition to technological observations that may influence artifact interpretation, information about a particular conservation intervention may become significant in guiding analysis in the future, including sampling decisions.

NOTES

1. The Museum Conservation Institute (formerly the Smithsonian Center for Materials Research and Education) is the Smithsonian Institution's center for specialized technical collections research and conservation. I established the Archaeological Conservation Program in 1990 to promote greater integration of conservation and archaeological practices through field participation, collaborative research and training opportunities, and an active advanced conservation internship component. It has been supported by funding from the Smithsonian Institution, the Samuel H. Kress Foundation, and participating archaeological projects, including the Aguateca Archaeological Project.
2. The activities described in this chapter reflect the contributions of conservation fellows and graduate interns, whose participation in the project's laboratory-based sessions was funded through the Archaeological Conservation Program: Stephanie E. Hornbeck, assisted by Elizabeth C. Robertson (1998); Joanne M. Boyer (1999); Monica Shah, assisted by Candis C. Griggs (2000); Jill J. Plitnikas, assisted by Sylvia H. Keochakian (2001); and Kimberly A. Machovec-Smith and Margaret A. Kipling (2002).

PART B

Monuments and Hieroglyphic Texts



chapter

12

Monuments

Stephen D. Houston

For most of the Late Classic period, Aguateca served as the second capital of the Dos Pilas dynasty, itself a descendant of the royal family of Tikal (Houston 1993:110, Figure 4-7) (Table 12.1). At first on friendly terms, the dynasty was attacked by its Tikal cousins in AD 654. The ruler of Dos Pilas, Bajlaj Chan K'awiil (Ruler 1), then sought refuge at the more defensible Aguateca (for discussion of his name, see Zender 2010). The Maya understood and emphasized the fortress-like qualities of Aguateca. A family redoubt, it went by the name *K'inich Pa' Witz*, possibly "Sun-like Fortification [or Split] Hill" (Martin and Grube 2008:57; Stuart and Houston 1994:Figure 8).

Yet there is a puzzle, too. Aguateca is first mentioned at Dos Pilas, not in its own inscriptions. On Dos Pilas Stela 15, the second known ruler of Dos Pilas, Ruler 2, refers to the erection, in AD 721, of an otherwise unattested stela at Aguateca (Stuart and Houston 1994:91, Figure 105). His successor, Ruler 3, commissioned Aguateca Stela 2 to commemorate his conflict with Ceibal, an important neighbor to the east (Graham 1967:Figure 5). He also left Aguateca Stela 3, which celebrated a period ending a few years before (Graham 1967:Figure 9). A bit later are two surviving records, Aguateca Stelae 1 and 5, from Ruler 4 of the dynasty (Graham 1967:Figure 3). But this king fell on hard times, fleeing into exile (*lok'oyi?*) in AD 761 (Houston 1993:117; Martin and Grube 2008:63).

The later history of Ruler 4 was once thought to be uncertain. The eroded Stela 6 at Aguateca currently suggests a more seamless transition for the dynasty. Contact sheets at the Corpus of Maya Hieroglyphic Inscriptions Project, taken by Ian Graham and kindly supplied by Barbara Fash, show what appears to be, at position C6–D7, the captive expression used by Ruler 4 (Figure 12.1). Much like Ceibal Hieroglyphic Stairway 1, Tablet 9, WW2, the captive's name is spelled **'a-ku[lu]-AJAW**, *ahkul ajaw*, "Turtle-place lord." The *ahkul* is probably in reference to the San Juan Acul Lake, 16 km to the northwest of Aguateca, on the southern bank of the Pasión River (Houston 1993:116–117). Following the captive's name is the standard Emblem Glyph of the Aguateca lord, *k'uhul mut ajaw*, a later variant of the Emblem used by Aguateca/Dos Pilas and Tikal (Houston 1993:Figure 4-1).

The context is suggestive. Within a few months the next ruler, Tahn Te' K'inich, would come to the throne (*johy-aj ti-ajawil*). Most likely, the date associated with Ruler 4, 9.16.18.15.11, December 7, AD 769, was his death date. In support of this, the structure of information on Stela 6 recalls Aguateca Stela 1. Another account of smooth transition, it records a death, in this case of Ruler 3, succeeded by two accession-related dates for Ruler 4. Ruler 4 did not perish "violently," as once suggested, but seems to have lived to full age at Aguateca, without any hint of dynastic interregnum (cf. Houston 1993:117, 119). He was probably buried at Aguateca, perhaps in Structure L8-6, which backs Stela 6, or in Structure L8-5, a building looming over his own Stela 1. Both are eastern pyramids, consistent with the mortuary pattern of their predecessor, Ruler 2. His crypt also lay under an eastern building, Structure L5-1, at Dos Pilas (Demarest et al. 1991).

Tahn Te' K'inich is the principal figure of this chapter, and the most relevant to epigraphic findings by the First Phase of the Aguateca Archaeological Project. Aguateca Stela 6 yields an unambiguous birth date, on 9.15.16.12.1, January 22, AD 748. With his accession date, this record shows that he came to the throne at 22 years of age. His birth falls some seven years after the accession of Ruler 4 and close to Ruler 4's major commission, Ceibal Hieroglyphic Stairway 1. The chances are strong that Tahn Te' K'inich was the son of Ruler 4. Nonetheless, the only possible parentage statement, on Aguateca Stela 19:A6-**U-[CHIT]CH'AHB**, *u chit ch'ahb*, of obscure reading but more secure genealogical meaning (see Machaquila Stela

Books: Life and Politics at Aguateca - Inomata 2014, page 234(249 / 371)
Dates Tables: Aguateca Dates, page 1

Table 12.1. Hieroglyphic Dates at Aguateca.

Date		Julian Equivalent	Provenance	Event
Earlier or foreign lords				
(9.9.0.0.0)	3 Ajaw 3 Zotz'	May 9, 613	St. 16:A1–B1	stone-wrapping
(9.9.13.0.0	3 Ajaw 3 Wayeb	March 2, 626	?	PE?
(9.10.0.0.0)	1 Ajaw 8 K'ayab	Jan. 24, 633	St. 16:E1–F1	stone-wrapping
Ruler 1				
(9).13.0.0.0	8 Ajaw 8 Uo	Mar. 15, 692	St. 5:C1–D2	scat., D, CP
Ruler 3				
9.15.0.0.0	4 Ajaw 13 Yax	Aug. 18, 731	St. 3:A1–A3	scattering
(9.15.4.6.4)	8 K'an 17 Muwaan	Nov. 29, 735	St. 2:A1–B1	war
(9.15.4.6.5)	9 Chic. 18 Muwaan	Nov. 30, 735	St. 2:B2–C1	axing
(9.15.4.6.11)	2 Chuween 4 Pax	Dec. 6, 736	St. 2:D2–E1	*nawaj*
(9.15.)5.0.0	10 Ajaw 8 Ch'en	Jul. 22, 736	St. 2:G1–G2	scattering
(9.15.9.)9.0	5 Ajaw 8 K'ayab	Dec. 28, 740	St. 1:B1	scattering
(9.15.9.16.11)	13 Chuween 14 Xul	May 28, 741	St. 1:B4	death
Ruler 4				
(9.15.9.16.15)	4 Men 18 Xul	June 1, 721	St. 1:B6	headband
(9.15.9.17.17	13 Kaban 20 Yaxk'in	June 23, 741	St. 1:B11–A12	accession
(9.15.)10.0.0	3 Ajaw 3 Mol	Jun. 26, 741	St. 1:D1–D2	scattering
(9.16.5.0.0)?	*8 Ajaw *8 Zotz'	Apr. 8, 756	St. 5:A1–B1	PE?[a]
(9.16.18.16.11)	1 *Chuw. 14 K'ayab	Dec. 7, 769	St. 6:D5–C6	death?
Tahn Te' K'inich				
9.15.16.12.1	12 *Imix 14 Kumk'u	Jan. 22, 748	St. 6:A1–A6	birth
(9.16.19.0.14)	*5 Ix 12 Pop	Feb. 8, 770	St. 6:F1–E2	accession
(9.16.19.0.17)	*8 Kaban *15 Pop	Feb. 11, 770	St. 6:F6–E7	war?
(9.16.19.10.11)	7 Chuween 9 Sak	Aug. 24, 770	St. 6:G3–H3	?
(9.17.0.0.0)	13 *Ajaw 18 Kumk'u	Jan. 20, 771	St. 6:G7–H7	PE
(9.17.)5.0.0	6 Ajaw 13 K'ayab	Dec. 25, 775	St. 19:A1–B1	?
(9.17.7.5.19)	13 Kawak 17 Zotz'	April 12, 778	St. 19:C5–D5	*jubuyi*
(9.17.7.10.16)	6 Kib 14 Ch'en	July 16, 778	St. 19:F3–E4	*yalaw*
(9.17.16.17.1	4 Imix 14 Mak)	Oct. 4, 787	St. 14:implied	?
(9.)18.0.0.0	11 *Ajaw 18 Mak	Oct. 7, 790	St. 7:B1–B2	PE
(9.)18.0.0.0	11 *Ajaw 18 Mak	Oct. 7, 790	St. 14:B3–B4	PE
(9.19.0.0.0)	9 Ajaw (18 Mol)	Jun. 24, 810	Altar M:A1	PE

Note: CP = completion of period; D = dance; PE = period ending. All Christian equivalents derive from the 584285 correlation, with acknowledgment that this may be, on plausible grounds, one day off (Martin and Skidmore 2012); day and months signs are conventional. Parentheses indicate reconstructed elements, never present in the text; asterisks indicate plausible reconstructions.

[a] The date on Aguateca Stela 5 is highly problematic. An accession and a far earlier, crucial Period Ending are mentioned in relation to Ruler 1, but Ruler 4's name, titles, and a 5+ Zotz month suggest a later, dedicatory Period Ending of 9.16.5.0.0. This placement is the only major Period Ending with a Zotz' month during Ruler 4's lifetime. Systematic stripping near Stela 5 might resolve the problem by finding additional fragments of this badly shattered monument.

6:B11, Graham 1967:Figure 55)—refers to a father who captured one K'an Bahlam, "Yellow Jaguar." This captive is not linked elsewhere to Ruler 4, as would be expected, nor does the name of a mother accompany the father's. Tahn Te' K'inich's name poses another problem (Figure 12.2). The final element confirms that he was identified with an aspect of the Maya sun god, K'inich. Yet the first two elements, while readable as "chest" and "tree/wood," do not conform to verbal statements in royal theonyms of this sort. One version, on Aguateca Stela 7:A6, shows an un-

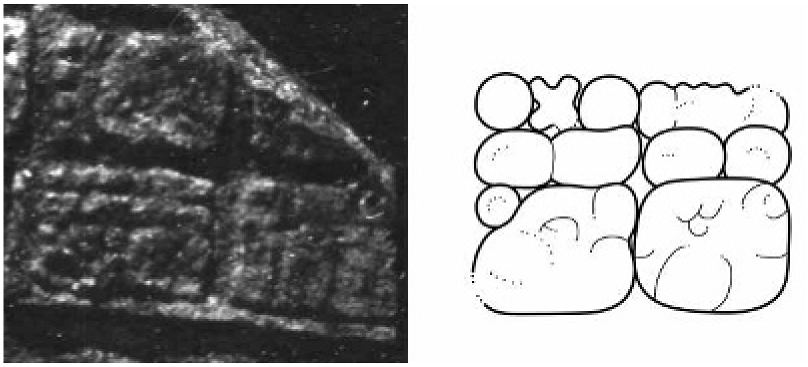


Figure 12.1. Close-up photograph of Stela 6:C7–D7 and drawing of Stela 6:C7. (Drawing by Stephen Houston; photographs by Ian Graham, courtesy of the Corpus of Maya Hieroglyphic Inscriptions program, Peabody Museum. © President and Fellows of Harvard University)

usual variant of Tahn as a semblant of an obsidian blade (Figure 12.2c), a spelling found also on La Amelia Hieroglyphic Stairway 1:H1 (Figure 12.2d) (Houston 1993:Figure 4-24)—perhaps some relation, as yet undetermined, with a common term for “obsidian,” *taaj* (Houston et al. 2004:87). Both co-occur with an unusual **TE’** logograph.

What is clearer is that Tahn Te’ K’inich’s titles signal high rank and importance—“holy lord of Dos Pilas/Tikal” (*k’uhul mut ajaw*), “he of the 3 captives” (*a 3 baak*), “he the new [first] *kaloomte’*” (a title linked historically to a period of contact with the Mexican city of Teotihuacan). The use of “new” or “first” with *kaloomte’* hints that Tahn Te’ K’inich represented some new phase of the dynasty. The title *kaloomte’* is employed by earlier rulers of the family, such as Rulers 2 and 4, but without the adjective (see Dos Pilas Hieroglyphic Stairway 3:C3, Tamarindito Hieroglyphic Stairway 3:E1, Houston 1993:Figures 4-17, 4-23). Another enigmatic title, **AJ-9-HA’B-ta**, possibly read by this time of the Classic period as *aha’btal* or *aha’blat*, appears both with Tahn Te’ K’inich and a later lord of Ceibal, Wat’ul K’atel, from a resurgent local dynasty at that city (see Aguateca Stelae 14:C4, 19:B5, and Ceibal Stelae 7:B8, 9:C3, 10:B5, 12:B7). A small site close to La Amelia, El Caribe, has three monuments from approximately the same time. One of them, Stela 2 (position C4), records the title with the number 7 rather than 9. The reason for the variance is not known, but it suggests that the expression formed part of a larger sequence of tabulations. The number 9 may have been one of many possibilities.

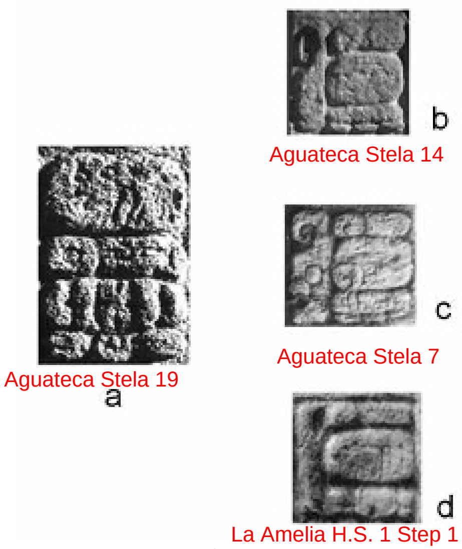


Figure 12.2. Name glyph of Tahn Te’ K’inich. (a) Stela 19:B4. (b) Stela 14:D1. (c) Stela 7:A6. (d) La Amelia Hieroglyphic Stairway 1, I:H1. (Photographs a and b by Takeshi Inomata; c by Ian Graham, courtesy of the Corpus of Maya Hieroglyphic Inscriptions program, Peabody Museum. © President and Fellows of Harvard University; d by Edwin Shook, Carnegie Institution of Washington)

Tahn Te’ K’inich existed within a complex political landscape. He had ambiguous, but probably amicable, relations with Ceibal and La Amelia. A ruler at Ceibal, Ajaw Bot, acceded to the throne just under a year later than Tahn Te’ K’inich, on January 20, AD 771. The fact that an accession took place on a Period Ending is highly unusual; that it took place a relatively brief span after the accession at Aguateca recalls practices in the kingdom of Piedras Negras at about this time. There subordinate lords acceded to titles after the enthronement of their overlord. The sudden appearance of Ajaw Bot suggests a similar imposition by a stronger, perhaps related lord at Aguateca. Tahn Te’ K’inich, too, is probably mentioned, if in an eroded passage, on Ceibal Stela 6:A2–B3. Notably, on Ceibal Stela 7, this lord wears a similar headdress to that shown with

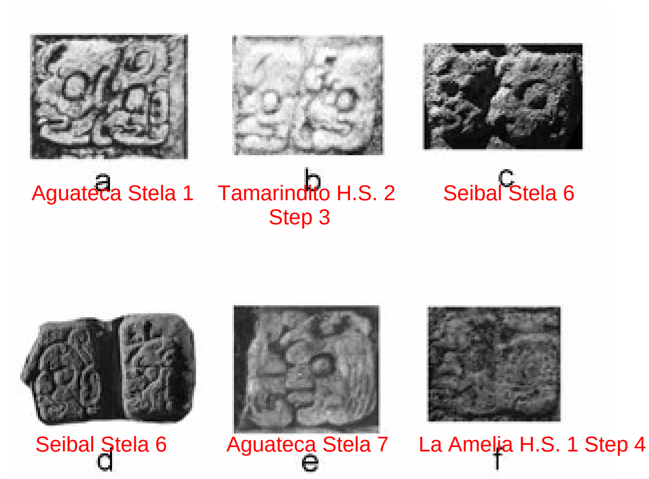


FIGURE 12.3. Glyphs of "GI" K'awiil. (a) Aguateca Stela 1:D7. (b) Tamarindito Hieroglyphic Stairway 2, Step III:N2–P2. (c) Stela 6:E5. (d) Ceibal Stela 6:B7–A8. (e) Stela 7:E2. (f) La Amelia Hieroglyphic Stairway 1, ~~V~~IV:C2. (Photographs a, b, c, d, and e by Ian Graham, courtesy of the Corpus of Maya Hieroglyphic Inscriptions program, Peabody Museum. © President and Fellows of Harvard University; f by Edwin Shook, Carnegie Institution of Washington)

Tahn Te' K'inich on Aguateca Stela 6—most of the details are the same, including an agnathous skull and spotted (jaguar hide?) covering above. Conceivably, a particular item of dress passed from Aguateca to Ceibal.

At a later date, in AD 802, a separate lord, also using the title Ajaw Bot but with full-fledged use of the Dos Pilas/Aguateca Emblem, came to the throne of the small site of La Amelia. Little more than an elevated palace with a hieroglyphic stairway, La Amelia lies just south of the Pasión River, on the way toward its merger with the Usumacinta (Martin and Grube 2008:65). Tahn Te' K'inich is mentioned in connection with a pre-accession event for this Ajaw Bot, on April 7, AD 802. Yet the reference is, to be more precise, an assertion that the "god" (*u-k'uhil*) of Tahn Te' K'inich was physically present (*yich[o]nal*) at this rite. A striking attribute of the Dos Pilas/Aguateca dynasty is their frequent mention of what may be a family deity, "G1"-K'awiil (Figure 12.3). The stela erected by Ruler 2 of the dynasty at Aguateca (see above) was said to belong to this deity, and the god makes appearances from then on, especially with Ruler 4 and Tahn Te' K'inich. The former celebrated a Period Ending under the claimed witness of the god (Figure 12.3a) (Aguateca Stela 1:D6–D7); the banner, *lakam*, of the deity also "fell," *jubuyi*, a day after his evident exile (Figure 12.3b) (Tamarindito Hieroglyphic Stairway 2, Step III:N2–P2; Houston 1993:Figure 4-21). Tahn Te' K'inich, too, came to the throne under such purported witness (Figure 12.3c) (Stela 6:E5), as did the later Ajaw Bot of La Amelia.

A reasonable interpretation would be that the god, perhaps materialized as an effigy, participated in the pomp of the dynasty and its close kin. Even the earlier Ajaw Bot at Ceibal highlights him on one of his commissions, Stela 6 (B7–A8), at a time close to his accession (Figure 12.3d). Legitimate ascension to the thrones of Aguateca, Ceibal, and La Amelia might have relied on the god's affirmative presence. The curious timing of the first Ajaw Bot's accession at Ceibal, the use of the full Dos Pilas/Aguateca Emblem at La Amelia (but not, strangely, at Ceibal), and the pervasive appeal to a shared god suggests the existence of congenial relations between rulers of the three sites. Yet the pattern of amity or even overlordship is unclear. The link to Ceibal is made insecure by the frustrating erosions of its Stela 6; the citation at La Amelia is to the god of Tahn Te' K'inich, not to that ruler as a superordinate authority. It could be that a new entente came into existence at this time. But it was less of overt dominance than a shared subservience to a supernatural being—if one controlled by a particular branch of the dynasty.

In all probability, Tahn Te' K'inich was about to celebrate the 9.19.0.0.0 k'atun in AD 810, possibly attested on the unfinished Altar M at Aguateca, and an unfinished pyramid, Structure L8-8, was under construction for his tomb (Inomata et al. 2004:807–808, Figure 11). Yet the last reference to Tahn Te' K'inich is an indirect one, at La Amelia, not Aguateca. Since only eight years separate the reference at La Amelia from the presumed date of Altar M, the ruler was presumably active during the first decade of the ninth century AD, exerting a regional sway within a religious idiom rather than one of explicit overlordship. Alternatively, by the time of the reference at La Amelia, he had already passed away. The use of the full dynastic Emblem at La Amelia implies some assertion of transferred authority from a larger, more established site to a negligible one.

Whatever the exact scenario, Tahn Te' K'inich disappeared from notice in his seventh decade. The miscellaneous texts from his reign (see Chapter 13) are striking largely because of the number of noble youths or royal offspring who owned or produced objects with glyphs. The texts merit equal attention because of the perceptible invisibility of royal ladies. Amply attested in the imagery and texts of dynastic predecessors, such women disappear altogether from later accounts. Aguateca Stela 13 reveals a new kind of personage, sculptors, who make a first appearance in Tahn Te' K'inich's reign. Previous texts of the dynasty had failed to credit the actual carvers of royal monuments, in contrast to the sculptures at Tamarindito and Arroyo de Piedra (e.g., Graham 1967; Houston 1993:Figures 2-9, 3-4, 3-21, 3-20; note, however, that a revised drawing by Ian Graham shows a possible sculptor's signature on Aguateca Stela 5, a monument of Ruler 4 of Dos Pilas/Aguateca [Houston 1993:Figure 4-13]; the Ceibal Hieroglyphic Stairway, from the same reign, similarly mentions a sculptor on Tablet 9:AAA2–BBB-2 [Graham 1996:61]). Aguateca Stelae 7 and 13, along with La Amelia Panels 1 and 2 and Arroyo de Piedra Stelae 1 and 6, also display the names of sculptors, never more than two, and with no noticeable overlap between stelae. The sculptors on Aguateca Stela 7 appear to come from, respectively, a "Place of the Reeds" (see also the Ceibal Hieroglyphic Stairway:BBB2) and a location recorded by a curled element, where the sculptor may hold *ajaw* rank (Graham 1967:Figure 18).

As will become apparent, the relations between Aguateca and Tamarindito are complex, and the place identified by the curl may or may not be the same as the central component of the Arroyo de Piedra/Tamarindito Emblem. Without exception, that sign has vegetal embellishments (Arroyo de Piedra Stelae 2:3, 3:F2, G3; 6:B9; Tamarindito Stelae 3:base, 4:A23, C10; Hieroglyphic Stairways 2:I1, G'1; 3:C4, G3). The semblant at Aguateca does not (Aguateca Stelae 1:D8, base, 2:G7, 7:H4), a point that may prove telling in discussions of Aguateca Stela 16 (see below). By its location at the end of texts, the "curl" glyph at Aguateca signals clearly that it is a supralocation, one that envelopes or subsumes the *K'inich Pa' Witz*. Possibly it refers to the Petexbatun Lake or to some part of it, although this cannot be confirmed. Another supralocation or a reference to polities of the zone might be the *8 Pet*, "8 islands" or "8 provinces" mentioned in Aguateca (Stela 1:D8) and Arroyo de Piedra (Stela 1:C6–C7, there in connection with a high-ranking foreign sculptor from a place called *Chij Witz*, "the deer hill"; Houston 1993:Figure 3-20). As a tentative hypothesis, this might be either a single location—the peninsular Punta de Chimino?—or, by its hint of a collectivity, 8 Pet referred to the sum total of polities in the Petexbatun and adjacent areas.

THE SCULPTURES

Stelae 6, 13, 14, and 19 were found in the Main Plaza (Volume 1:Figure 1.5); Stelae 15, 16, 17, and 18 in the Barranca Escondida (Volume 1:Chapter 4, Figure 1.7). All carved monuments at Aguateca are of limestone. This results in the usual vagaries of preservation. If face down, a carving exhibits good preservation; if face up, the sculpture deteriorates into illegibility. The stelae of Tahn Te' K'inich are also of considerable size. This made them susceptible to greater shattering, but there is a strong likelihood that their fragmentation and toppling were deliberate, as at Dos Pilas, where stelae show signs of visible blows. The destruction documented in palatial quarters at Aguateca may well have extended to the overturned and broken sculptures in the main plaza.

The two locations deserve comment. To an unambiguous extent, the plaza presents a set of stelae that are still in situ. The rulers are costumed for evident dance, the usual attire of stelae in Classic Maya plazas, although only one sculpture, Stela 5, refers explicitly to the rite. The plaza stelae fall into two iconographic programs. One is of triumphant warriors (Stelae 2, 4, 6, 13?, 14, 19); the other is of incense scattering at Period Endings (Stelae 1, 5) or scepter dances (Stelae 3, 7). A cross-cutting subset are those with trussed or bound captives underfoot (Stelae 2, 7, 13, 19) or captives seated to either side of the standing ruler (Stelae 6). The purely calendrical celebrations with incensing cluster along the eastern sides of the plaza. The warrior monuments have no such patterning. Yet another subset are those that display god impersonations by Tahn Te' K'inich, that is, sculptures that depict an essential, transubstantive absorption, in dance, of a particular deity, as marked by masks and other clothing, such as boots (Houston et al. 2006:270–275): Stela 2, a jaguar being with Teotihuacan features; Stela 7, a serpent associated with water; Stela 14, a jaguar being like that on Stela 2, but now solely Maya. On Stela 19, Tahn Te' K'inich wears a headdress with an aspect of Chahk, the rain god. As a warrior, on Stelae 6 and 19, and perhaps on Stela 7, he appears always to clutch the same round shield, of the Jaguar God of the Underworld *en face*. Another consistent item of dress is a spear with barbs along its upper sides, just beneath the flint blade (Stelae 4, 6). The same spear may occur on Stela 19, although the barbs have now been covered or replaced, perhaps, by bound or twisted cloth. The crucial observation is that these sculptures, disposed to be seen and to receive interaction in the plaza, involve dance and martial display in an open area that was appropriate to such activities.

The Barranca Escondida sculptures are distinct. Two show a double-bladed weapon, which, to judge from its side notches, was made of flint (Stelae 17, 18). Stela 18 also displays a ruler grasping a three-bladed eccentric that, in other Maya imagery, accompanies Jaguar beings, incensers, and fire-drillers, as on Tikal Lintel 2, Temple III, and Tikal Altar 5 (Jones and Satterthwaite 1982:Figures 23, 72; David Stuart, personal communication 1984). Several other sculptures are notably earlier in date, the Early Classic Stela 15 or Stelae 16 and 17, carved just before the full onset of the Late Classic period. Even the style of the later sculptures in the Barranca fails to resemble other carvings in the oeuvre of Aguateca or Dos Pilas. They have irregular edges (Stela 17), exaggerated depictions of blades (Stela 18), and, where preserved, relatively deep, voluptuous carving (Stela 18, fragment, upper left). Not a one refers securely to members of the local dynasty.

Stela 6 (Figure 12.4)

A drawing of Stela 6 has been available since 1967. A full set of reconstructed dates appears in Houston (1993:Table 4-1), although the vertical column to the viewer's left remains a challenge to interpret because of erosion. Unfortunately, that section contains an important date, 12 [unclear day sign] 13 Muwaan, Xul or Yaxk'in, as suggested by the final **ni** syllable. Its precise placement in time cannot be determined. Graham's drawing, from sketches done in situ, shows an 8 for the month coefficient, while unpublished photographs at the Corpus Project at Harvard point to the number 13. A probable Distance Number at A7 is too eroded to provide much help. Whatever the exact date, it appears to explain the presence of the captives to either side of the ruler. Interpretations of the overall contents of Stela 6 are presented above. Much of the stela was stolen after Graham's visit, but the second phase of the Aguateca Project was able to expose the base, reproduced here, and take a series of photographs of a fragment from its top-center. The basal register, which in photos projects a clear version of the Aguateca toponym, *Pa' Witz*, has two other, more complex elements to either side. One is a volute with solid mass above, the other a deity head in what may be a basket or bowl. Presumably, these project some further toponymic information.

Stela 13 (Figure 12.5)

Stela 13 was turned by the Aguateca Restoration Project in 2003 and drawn by Oswaldo Chinchilla; the drawing is included here with his kind permission. The stela, which was found in multiple fragments in front of Structure L8-11, conforms to the standard display of Tahn Te' K'inich. A tall monument, it measures approximately 5.3 m in height of carving and 1.43 m in width (measurements provided by Oswaldo Chinchilla). Its captive is in uncomfortable, recumbent pose below, and the ruler has meaty thighs and engages in what appears to be god impersonation, in this case of a watery serpent with high feather panache. The theme is also found on the ruler's Stela 7, almost directly to the south, on the far side of the main plaza. Indeed, the counterposition may be deliberate, as part of an overall organization of stelae at the site. Stela 2, an impersonation of a jaguar god, albeit with Teotihuacan-like features, looked across to Stela 14 in mid-plaza, a monument with a similar theme. Most of Stela 13's text is gone, aside from a small column to the lower left and a diagonal to the lower right ("p" is for provisional, the numbers and letters here for convenience only).

pA1	**. . . ?**	an animal head
pA2	**?-?-?**	?
pA3	**[head]-AJ?-?-'a**	?
pA4	**?-?-na? u?-?-CHAN**	*u-chana'n?*, "his guardian"
pA5	**?-BAHLAM K'UHUL-MUT-AJAW**	*bahlam, k'uhul mut ajaw*, "jaguar," "holy lord of mut"
pB1	Calendar Round date	
pB2	**T'ABAYI?-yu-lu-?**	*t'abayi yu* . . , "is raised his carving"
C1	**?-?-?-?**	
D1	**?-?-?-?**	
E1	**?. . .**	

Although little can be read, the Emblem and style of the monument strongly suggest that it is a commission of Tahn Te' K'inich. Additional fragments from the upper left, perhaps still mixed with debris nearby, contained texts that would confirm the attribution. The angled and dated sculptor's signature is unusual in the Pasión region but finds a parallel in Panel 2 from La Amelia. The fact that Tahn Te' K'inich appears to have commissioned stelae for dedication on the same date opens the chance that this, too, could be a monument from 9.18.0.0.0. Stela 19 suggests in turn that the ruler also observed hotun (five-year) endings, so other dates such as 9.18.5.0.0.0 or 9.18.10.0.0

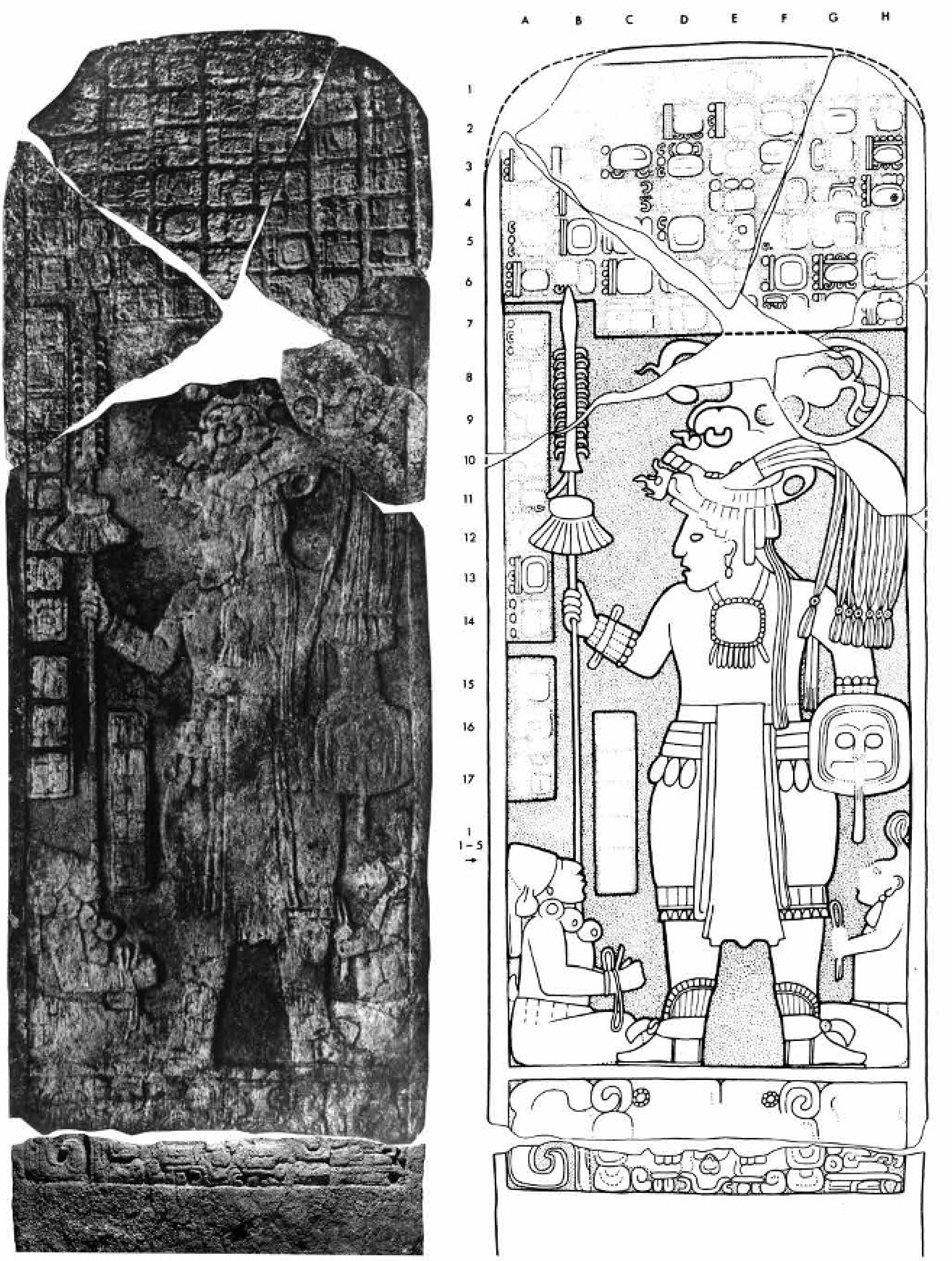


FIGURE 12.4. Stela 6. Stela butt photographed and drawn by Takeshi Inomata along with the main portion photographed and drawn by Ian Graham (1967:Figures 14 and 15, courtesy of the Corpus of Maya Hieroglyphic Inscriptions program, Peabody Museum. © President and Fellows of Harvard University)

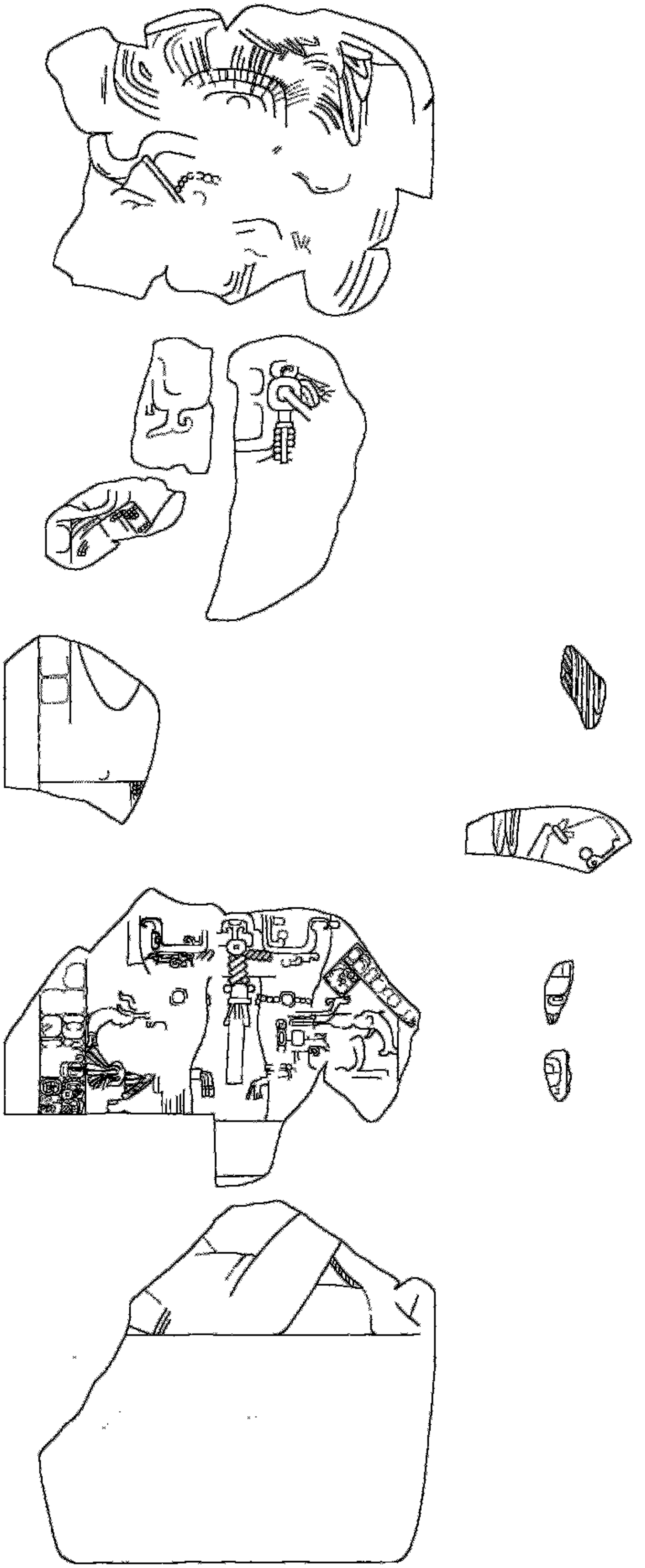


Figure 12.5. Stela 13. (Drawing by Oswaldo Chinchilla)

remain a possibility. The diagonal text would be consistent with a relatively late date in the reign of Tahn Te' K'inich. The structure of the parallel inscription at La Amelia resembles that on Stela 13: a Calendar Round date, almost certainly the latest on the monument, followed by *t'abayi*, the raising of the sculpture, and a reference to "his carving" (see La Amelia Panel 2:D1–D2).

Stela 14 (Figures 12.6 and 12.7)

Stela 14 was discovered in the central part of the Main Plaza during the 1990 season of Petexbatun Regional Archaeological Project. The open location accounts for its double-sided carving: the stela could be accessed ritually from both sides. In fact, such full carving, rare in the Pasión region, is an understudied feature in Maya epigraphy, beyond the banal observation that two acts of seeing would be required to access the imagery. Originally, the front side of Stela 14 faced northwest toward Structure L8-8, and a round uncarved monument, Altar N, was placed in front of it. In decay, the stela broke near the bottom and fell forward—or was pushed over—leaving the butt in its original location. The upper portion fractured in half when the stela hit the altar, a common enough occurrence with Maya sculpture; it then tumbled sideways to the northeast, coming to a rest, face up. The front side of the upper carving is severely eroded, and only vestiges of a standing figure are vaguely visible. The front side of the butt is fairly well preserved, however, and the back of the upper portion contains enough carving that we can discern details. The stela's height above the lowest carved area is roughly 3.4 m, and its maximum width is 1.38 m.

Front

A1	**?-?-?**	?
A2	**BAAK-ki**	*baak*, "captive"

Back

B1	**u-TZ'AK-AJ**	*u tz'akaj*, "their ordering"
C1	**19 he-na**	*19 heen*, "19 days"
B2	**0 WINAL, 3 HA'B**	*0 winal, 3 ha'b*
C2	**u-ti-ya**	*uhtiiy*, "it happened"
B3	**'i-u-ti**	*'iuti*, "now it happens"
C3	**11 AJAW**	11 Ajaw [day]
B4	**18 ma-MAK**	18 Mak [month]
C4	**u-18 "K'atun' [WINIK-HA'B]**	*u-18 "k'atun"*
	(9.)18.0.0.0	Oct. 7, AD 790
B5	**?-?-ja**	? [event]
C5	**u?-?-?**	?
B6	**?-?-TUUN?-ni?**	?
C6	**ti?-?-na?**	?
D1	**TAHN-TE'-K'INICH**	*Tahn Te' K'inich* [ruler's name]
D2	**AJ-3-BAAK-*ki**	*a 3 baak*, "he of the 3 captives"
D3	***a-*YAX-KAL-TE'**	*a yax kaloomte'*, "he the new kaloomte'"
D4	**AJ-9-HA'B-ta**	*a 9 ha'blat* or *ha'btal*, a title
D5	**3 "K'atun" [WINIK-HA'B] AJAW**	3 "k'atun" ajaw, ruler 40–60 years old

pE1	**5-?-?**	?
pF1	**?-?-?**	?
pF2	**TAHN-TE'**	Tahn Te' [ruler's name]
pF3	**K'INICH**	K'inich [ruler's name]

Dates

(9.17.16.17.1)	4 Imix 14 Mak	Oct. 4, AD 787
+ 3.0.19		
(9.18.)0.0.0	11 Ajaw 18 Mak	Oct. 7, AD 790

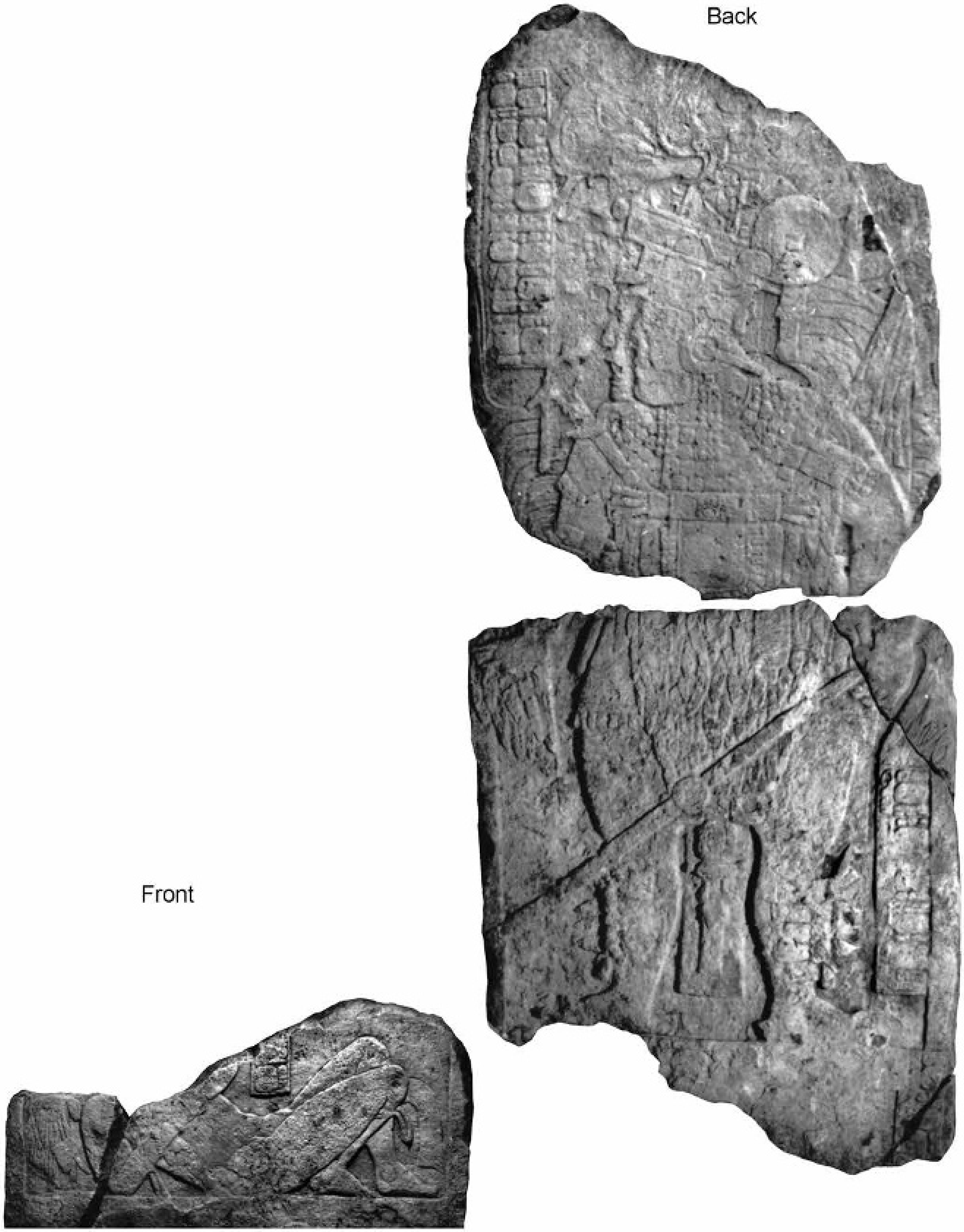


Figure 12.6. Stela 14. (Photograph by Takeshi Inomata)

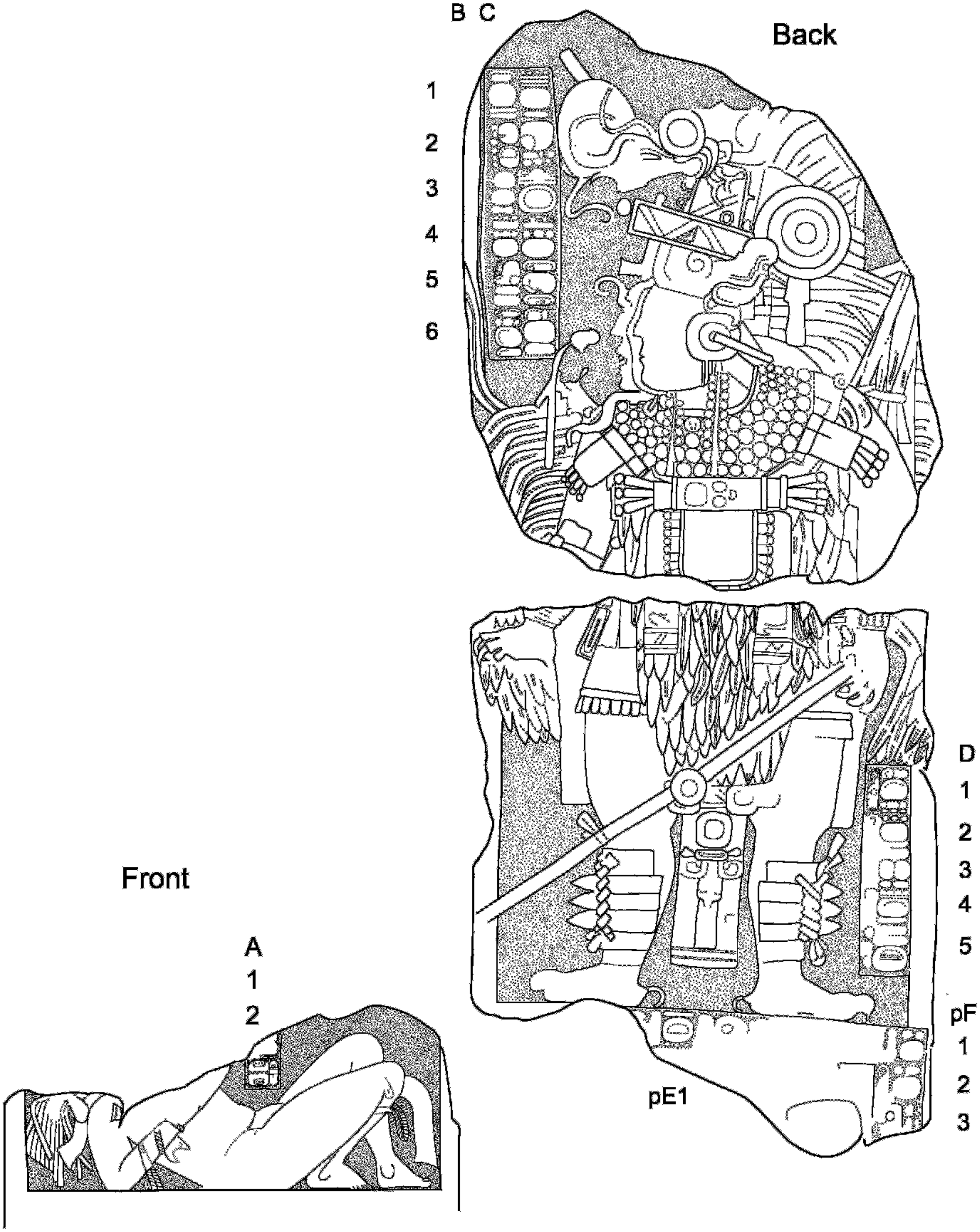


FIGURE 12.7. Stela 14. (Drawing by Takeshi Inomata and Marijke Stoll)

The numerical coefficient of the Distance Number is eroded, yet the full outlines of the dots affirm that “3” is correct. The presence of captives on both sides of the stela suggests that the earlier event is war-related. A verb at B5 includes a rare sign, a **chu** variant with a projecting torch that remains undeciphered. Very likely, a continuous text ran near the bottom of this side, above a frame that held, presumably, the image of a captive; the ruler’s name is clear, but other elements are not. The provisional numbering used here for the basal text may be misleading. It overlooks probable texts between E and F, in part because the blocks are obliterated and cannot be quantified with any confidence.

The imagery is one of Jaguar deity impersonation, with the “X-ray” device that permits the viewer to see deity and royal profiles simultaneously. Tahn Te’ K’inich appears to grasp, in relaxed pose, a short spear, his jaguar boots visible, along with a profusion of plumes along his front and back. As with most captives at Aguateca, the particulars of their origin are illegible to a frustrating degree. The stela would have afforded an opportunity, now irretrievable, to understand regional conflicts during the second quarter of the Late Classic period. Without question, Tahn Te’ K’inich prided himself on martial prowess. His predecessor, Ruler 4, avoided such displays, although, in a sense, he devised similar images in tableaux form: his captive monument at Dos Pilas, Hieroglyphic Stairway 3, would present a comparable scene if the ruler were to stand on its treads and face outward to an audience (Houston 1993:Figure 4-23).

The absence of hieroglyphic stairways at Aguateca is mystifying. This format dominated the corpus of the dynasty, especially in the reigns of Rulers 1, 2, and 4, and further underscores other, enigmatic discrepancies at Aguateca, including the absence of a ball court. For their part, the captives at Aguateca appear in two formats, as stripped captives underfoot (Stela 7, 14, 19) or as more amply clothed figures seated near the ruler’s feet (Stela 6). The reasons for these differences are unclear, but the former examples clearly amplify discomfort, humiliation, and a parlous state, hinting at coming demise.

Stela 19 (Figures 12.8 and 12.9)

Stela 19 was discovered in 1999 in front of Structure L8-6 in the Main Plaza (Volume 1:151). There was no altar associated with this stela. It was carved on the front side only and was found face down, broken into three fragments. The carving is slightly eroded. Its total height is 4.88 m, and the height above the lowest carved area is 3.74 m. Its maximum width is 1.43 m.

A1	**6 AJAW**	6 Ajaw [day]
B1	**13 “K’ayab” [K’AN-‘a-si-ya]**	13 K’ayab [month]
	(9.17.)5.0.0	Dec. 25, AD 775
A2	**NAAH-5-TUUN-ni**	_naah 5 tuun_, “first five stones”
B2	**?-OOK-ki**	_? ook_, “? foot”
A3	**?-K’UHUL-OOK-tzi?**	_? k’uhul ook tzi?_, “? holy foot”
B3	**u-K’AL-wa TUUN-ni**	_u k’alaw tuun_, “he wraps the stone”
A4	**ch’a-JOOM-ma**	_ch’ajoom_, “incenser”
B4	**TAHN-TE’-K’INICH**	Tahn Te’ K’inich, Ruler of Aguateca
A5	**AJ-3-BAAK-ki**	_aj 3 baak_, “he of the 3 captives”
B5	__a-9-HA’B?-*la-ta__	_a 9 ha’b *lat_, “he of the 9 years past?”
C1u	**K’UHUL-MUT-AJAW**	_k’uhul mut ajaw_, “holy Mut lord”
C1l	**u-CHIT-CH’AHB**	_u chit ch’ahb_, “his son [loose paraphrase]”
D1u	**u-CHAN-?**	_u chanul?_ “his guardian”
D1l	**K’AN-na**	_k’an_, “yellow, precious”
C2u	**BAHLAM?**	_Bahlam?_ “Jaguar?”
C2l	**K’UHUL-MUT-AJAW**	_k’uhul mut ajaw_, “holy Mut lord”
D2u	**4 WINIK-HA’B-AJAW**	_4 winik ha’b ajaw_, “4 ‘k’atun’ ajaw”
D2l	**te-k’a-ja yo-OOK-ki**	_tehk’aj yook_, “his foot is stepping”
C3u	**‘o-HA’B**	_‘o ha’b_, “_‘o_ year”
C3l	**mo-HA’B**	_mo ha’b_, “_mo_ year”
D3u	**jo?-HA’B**	_? ha’b_, “_?_ year”

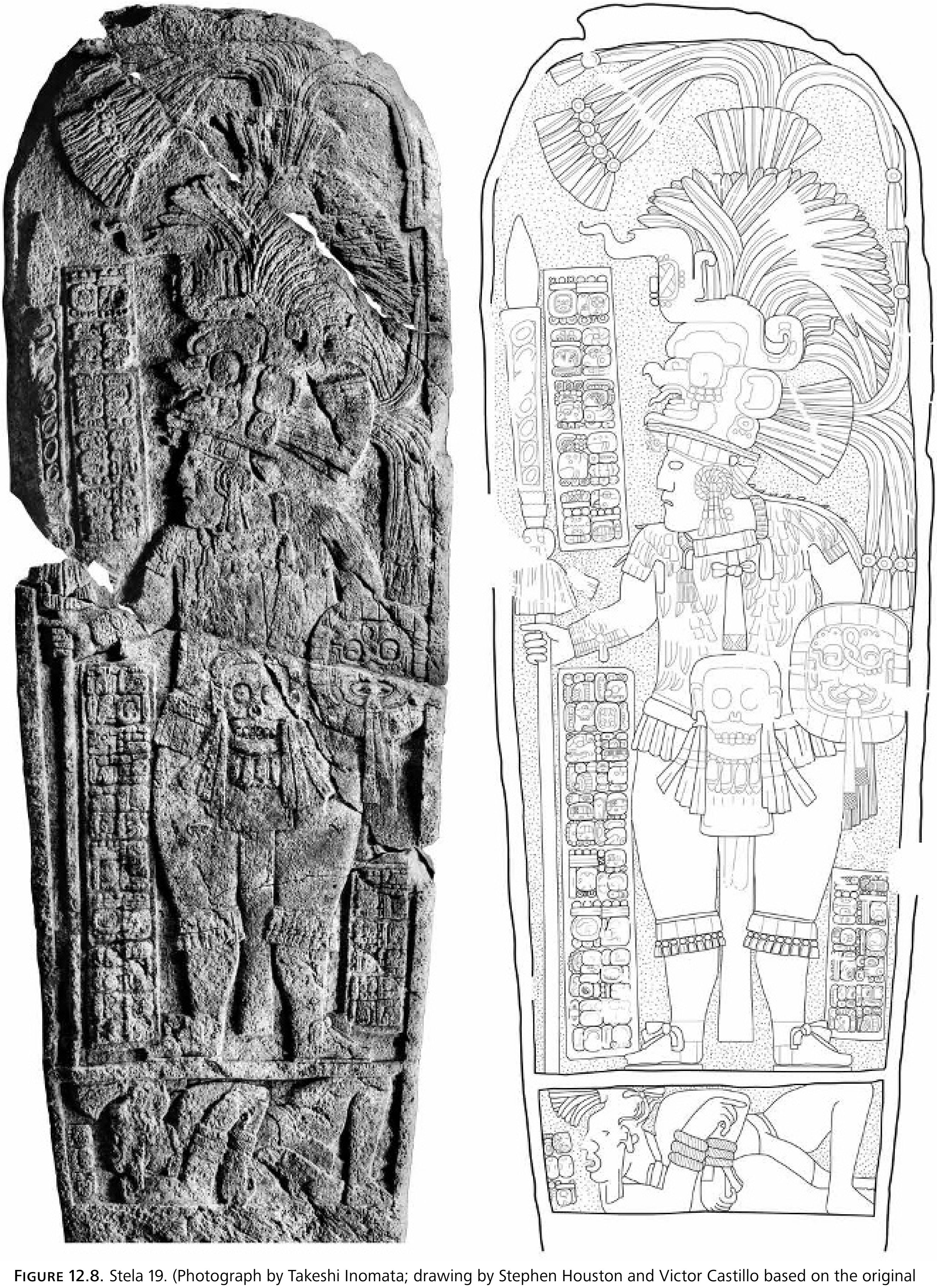


FIGURE 12.8. Stela 19. (Photograph by Takeshi Inomata; drawing by Stephen Houston and Victor Castillo based on the original drawing by Markus Eberl)

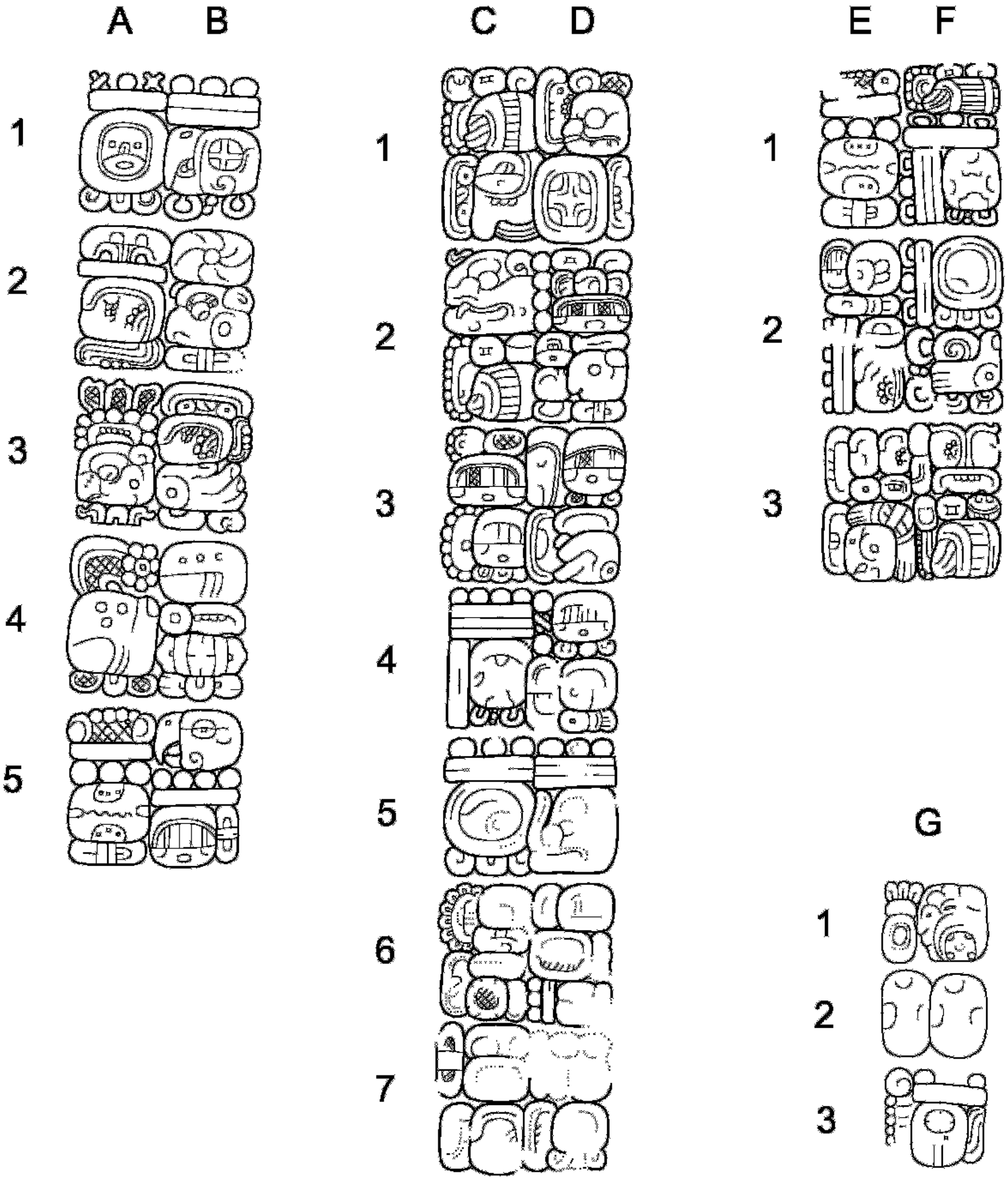


Figure 12.9. Glyph blocks of Stela 19. (Drawings by Stephen Houston)

D3l	**u-K'UHUL?-PAAT?**	*u k'uhul? paat*, "his holy back"
C4u	**19 *'days'**	19 "days"
C4l	**5 WINAL-ya**	*5 winaliiy*, "10 20-day periods ago"
D4u	**2 HA'B-ya**	*2 ha'biiy*, "2 years ago"
D4l	**'i-u-ti**	*'iuti*, "then it happens"
C5	**13 Kawak**	13 Kawak [day]
D5	***17 Zotz' [SUUTZ']**	17 Zotz' [month]
	(9.17.7.5.19)	April 10, AD 778
C6u	**ju-bu-yi**	*jubuyi*, "they fall"

C6l	**u-TOOK'-PAKAL-ka**	*u took' pakal*, "his flint, shield"
D6u	**?-?**	?
D6l	**CHAN-na? *?-k'a?**	*chan ?*, "sky ?"
C7u	**ta-ja?-?**	?
C7l	**'a?-ku?**	*ahk?*, "turtle?"
D7u	**?-?-AJAW?**	*? ajaw*, Emblem Glyph?
D7l	**u-CHAB-ji-ya**	*u chabjiiy*, "his doing"
E1	**AJ-3-BAAK-ki**	*aj 3 baak*, "he of the 3 captives"
F1u	**K'UHUL-MUT-AJAW**	*k'uhul mut ajaw*, "holy Mut lord"
F1l	**6 *K'IN 16 WINAL-ji-y**	*6 *k'in, 16 winaljiiy*, "6 days, 16 20-day periods ago"
E2u	**'i-u-ti**	*'iuti*, "then it happens"
F2u	**6 Kib**	
F2l	**14 Ch'en**	
	(9.17.7.10.16)	July 18, AD 778
F2l	**ya-AL-wa**	*yalaw*, "he hurls it"
E3u	**u?-?-?-?**	*u . . .*, "his . . ." [or the kaloomte' title?]
F3u	**a-TUM**	*a-tum*, "he of the [affective] heart?"
E3l	**u-K'ABA'-'a**	*u-k'aba'*, "his name"
F3l	**K'UHUL-MUT-AJAW**	*k'uhul-mut-ajaw*, Emblem

Captive's name

G1	**SAK-BAAH**	*sakbaah*, "white pocket gopher"
G2	**bo-bo**	*bob*, bird name or "coyote, wolf"?
G3	**a-7-so?-ni**	? [**so** reading suggested by Marc Zender, personal communication 2011]

Summary of Dates

(9.17.5.0.0)	6 Ajaw 13 K'ayab	Dec. 25, AD 775
+ 2.5.19		
(9.17.7.5.19)	13 Kawak 17 Zotz'	April 12, AD 778

[Two options for Distance Number]

(9.17.5.0.0)	6 Ajaw 13 K'ayab	Dec. 25, AD 775
+ *2.*5.16	(reversed position for *k'in*)	
(9.17.7.10.16)	6 Kib 14 Ch'en	July 18, AD 778

(9.17.5.19)	13 Kawak 17 Zotz'	April 12, AD778
+ *4.*17		
(9.17.7.10.16)	6 Kib 14 Ch'en	July 18, AD 778

The assumption here is that the Calendar Round positions are correct or, at least, in the case of the final date, that their day and month signs are consistent and the numbers plausibly identified. The first Calendar Round, the period ending, is certain, as is the second. It is the third that causes difficulty. The Distance Number (evidently 6.16) appears not to accord with the probable Calendar Round of 6 Kib 14 Ch'en, in which the color "black" and "kawak" month are fairly secure. The closeness of the date offered here points to its correct placement, as does the fact that the Distance Number may be erroneous, yet it does include the *k'in* and *winal* slot. The second option is the best, as it would preserve the linear flow of the chronology on the stela. What is unusual, however, is that the period ending comes first in the sequence, not at the conclusion, as on Aguateca Stelae 1, 2, and 6.

The inscription of Stela 19 is, for Aguateca, in an exceptional state of preservation. The initial date is a clear

Period Ending, with a "first 5 stone" notation that serves elegantly to confirm its Long Count placement. Connected to this is a couplet that involves, as its core element, a word for a "foot" or "leg," *ook*, as expressed in a homophonous term for "dog," and subfixed by a possible **tzi** syllable (the sign is still problematic in its reading). This phrase appears in variant terms from the Early Classic to the Postclassic periods, from Tikal Stela 31 to the Dresden Codex (by chronological order: Tikal Stela 31:C20–C21 [Jones and Satterthwaite 1982:Figure 52b); La Corona, Panel 1:O1–P1 [K1180 in the Kerr database, www.mayavase.com]; Tikal Temple IV, Lintel 3:D5–D7 [Jones and Satterthwaite 1982:Figure 74]; and Dresden 70, 63, 53b). The example from Tikal Stela 31 elaborates on the celebrated arrival of Sihyaj K'ahk', possibly from Teotihuacan or one of its proxies (Stuart 2000:472–478). This momentous event changed the political configuration of Early Classic Maya in the central Peten and led to much glyphic comment. Many of the elements on Aguateca Stela 19 are present, including a possible **ki** infixed as a complement to *ook*, a subfixed **tzi**? in the first *ook*, a prefixed *k'uhul*.

A similar complex of spellings occurs at Late Classic La Corona, Panel 1, where it glosses an arrival, perhaps described in terms of an "island," **PET**, or circuit; elsewhere, this verb, **PET**-ji-ya, here at La Corona, in the past tense of the passive, *petjiiy*, describes the making of round objects. Slightly later, at Tikal, on Lintel 3, Temple IV, the same complex occurs, with slight variations but shared constituents: *k'uhul*, **tzi?**, and, as on Tikal Stela 31, a verb for "completion" or "finishing," *tzutzuyi*, but here of "his foot, leg," **yo-OOK-ki**, *yook*, followed by the deity to whom the "foot" belonged. Aguateca Stela 19:A3 and the Tikal lintel, position C6, also share an undeciphered trilobate sign. Another such assemblage describes the "holy feet" of particular gods in the Dresden Codex (Dresden 70, 63, 53b). When considering La Corona, David Stuart and I have wondered independently if the references refer to completed trips or movements. But not just any transits: the texts may emphasize travels of large and transformative consequence that involved gods or sacred beings. Such may have transpired as part of the Period Ending celebrations on Aguateca Stela 19.

The text continues with the customary titles of Tahn Te' K'inich, including his role as "incenser," **ch'a-jo-ma**, *chajoom* (A4), and the probable if still perplexing titles of his father, who is said to have lived beyond 60 years of age (D3). To stress the theme of movement, perhaps circuits, a final passage in the section mentions the "stepping of his leg," **te-k'a-ja yo-OOK-ki**, *tehk'aj yook*, a phrase otherwise known only on a panel at Dumbarton Oaks from the area of Palenque, Chiapas (position C3–D3; e.g., Miller and Martin 2004:Figure 77). What follow are three *ha'b*, a cycle of 360 days, each prefixed by what may be, in at least two cases, terms for birds, an *'o*, a kind of raptor, and a *mo'*, or "macaw." Birds occur as sacrifices with New Year's cycles in the Dresden Codex, among other places (D25–D28), and there is some suspicion of related rites in this part of the inscription on Stela 19. The passage ends, or the following sequence begins, with a phrase, *u k'uhul paat?*, "his holy back?" In unusually elaborate terms, Stela 19 resonates with ritual processions and calendrical performances that seldom achieve such prominence in Classic inscriptions. A tangential relation might have existed with the 819-count, which involved directional movements and, in one example at Copan, from Temple II, the "foot" or leg of a deity (Kelley 1976:Figure 17).

The next passage treats unambiguously of war and of its positive outcome, the "falling down," *jubuyi*, of "weapons," *took'*, "flint," and *pakal*, "shield." Regrettably, the victim's home site and titles are illegible in this, the least-preserved portion of the text. The author and agent of the victory is less equivocal, Tahn Te' K'inich. The final segment of text, a few months later, involves a verb root, possibly *yal*, "hurl, throw" in Ch'orti' Maya, here in transitive form but with unclear direct object. The pronoun necessary to that status is present, but the other elements are difficult to read; there is a chance that, rather than being a direct object, this is none other than the Yax Kaloomte' title, although this would be grammatically unusual. At La Amelia, the verb records the concept of throwing a ball, if a metaphoric one in the person of a captive (Houston 1993: Figure 3-21, Panel 2:A3). The ruler is also described by a second "name," *k'aba'*, as, possibly, *a-tum*, "he of the heart." It would be not surprising if some action of a sacrificial nature were the focus here, including that of heart excision. The captive's name poses the same difficulties for the war record of Tahn Te' K'inich—the name is relatively legible but cannot be linked to any known location or antagonistic dynasty.

Stela 15 (Figure 12.10)

Stela 15 was found in the Barranca Escondida in front of the rock outcrop. Its butt was still standing, but most of the upper and midsections may have been taken by looters. A small block with glyphs is assumed to be part of this monument because of its similar quality of limestone and

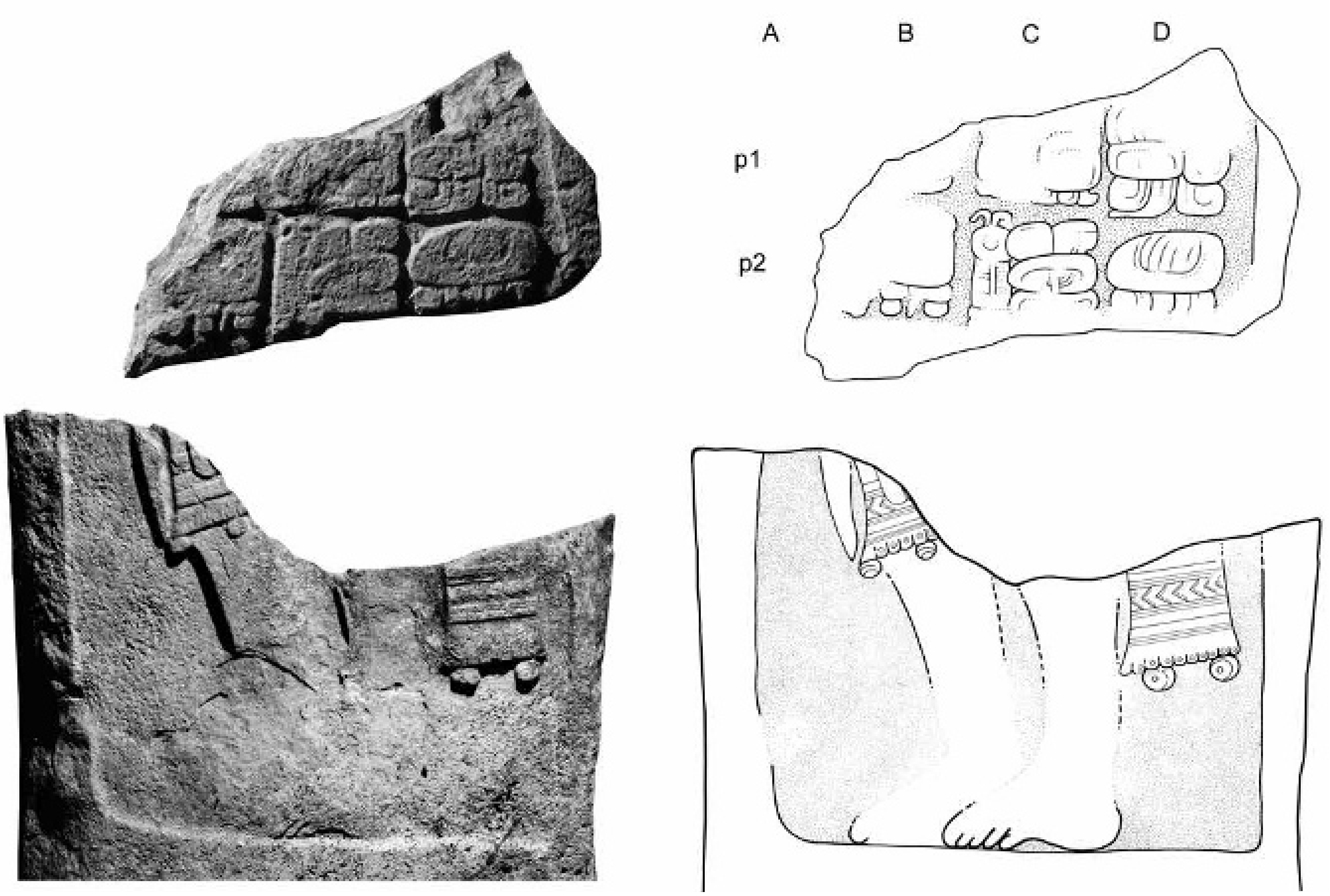


FIGURE 12.10. Stela 15. (Photograph by Takeshi Inomata; drawings by Stephen Houston and Markus Eberl)

stylistic resemblance. The stela is carved on the front side and may have been associated with a round plain monument, Altar O. Its width at the base of carving is 0.75 cm, and the height above the lowest carved area may have been around 2 to 2.4 m if it contained a glyphic text above a standing figure. The text consisted of four columns, but on present evidence the precise number of rows is impossible to determine, hence the use here of "p" designations for provisional.

. . .		
Bp1	**. . .-?**	?
. . .		
Bp2	**?-?-?-la**	?
. . .		
Cp1	**. . . *WINAL . . . HA'B-ma**	*. . . winal . . . ha'b*, Distance Number
Dp1	**CHUM-*la-ji-ya**	*chumlajiiy*, "he sat"
Cp2	**ta-AJAW-IL**	*tajawil*, "in lordliness"
Dp2	**AL?-ya**	*aliiy*, "it happened?"
. . .		

The text dates to the Early Classic, with a distinct form of the **ya** syllable that was still in use during the initial decades of the sixth century AD: a similar version occurs in the earliest monument thus known from the Petexbatun region, Tamarindito Stela 5:Bp6. Most likely, an implicit date—that of a lord's accession—linked to another, late one, perhaps of a Period Ending. The hem of chevrons, hair, and extruded eyeballs on Stela 15 is nearly identical to that on the Tamarindito monument, also shattered and, in the case of Tamarindito, definitely reset, in that the sculpture was fitted into the front facing of a terrace. Although the stela has a flaked and spalled surface, it probably decorated the thigh and lower torso with the Ajaw spots that occur widely on early carvings from Arroyo de Piedra and, at Aguateca, on Stela 16, which is probably some 150 years later. Tamarindito Stela 5 portrays a lord holding a sacrificial blade, and it stands to reason that such an object was probably gripped by the lord on its counterpart at Aguateca.

Stela 16 (Figure 12.11)

Stela 16 was discovered in the Barranca Escondida close to facing bedrock. Broken into four sections, it appears to have been moved partly by looters, but not far from Stela 15. Its carving is on the front side only, and its preservation is far from crisp. The carving is somewhat eroded, with particular damage, doubtless ancient, on the face of its figure. Altar P may have been associated with this or other stelae of the immediate area. Stela 16's dimensions are 2.88 m in total height, 2.16 m in height above the lowest carved area, and 0.70 m in maximum width.

A1	**3 AJAW**	3 Ajaw [day]
B1	**3-TE'-SUUTZ'**	3 te' "Zotz'" [month]
	(9.9.0.0.0)	May 9, AD 613
A2	**13 HA'B**	13 *ha'b?*
B2	**K'AL-wi?-TUUN**	*k'alwi tuun*, "he stone-wraps"
C1	**?-ch'a-IL-K'AWIIL?-la**	?-*K'awiil/* [royal name?]
D1	**?-?-?**	? [royal name?]
C2	**?-la AJAW-wa?**	Tamarindito/ARP Emblem
D2	**7 HA'B?-ta?**	7 ha'b?
E1	**1 Ajaw?**	1 Ajaw/
F1	**8 "K'ayab" [K'AN-'a-*si-ya]**	8 "K'ayab"
	(9.10.0.0.0)	Jan. 24, AD 633?
E2	**K'AL-wi-TUUN**	*k'alwi tuun*, "he stone-wraps"
F2	**tu-K'UH-IL**	*tuk'uhil*, "for his god"

Summary of Dates

(9.9.0.0.0)	3 Ajaw 3 K'ayab	May 9, AD 613
+ 13.0.0		
(9.9.13.0.0	3 Ajaw 3 Wayeb)	March 2, AD 626
+ 7.0.0		
(9.10.0.0.0)	1 Ajaw 8 K'ayab	Jan. 24, AD 633

The dates are problematic, with one solution proposed by Eberl (2000:71). The first Calendar Round is clear, a k'atun ending, with a probable Distance Number of 13 *ha'b*. Yet this would lead to a date unexpressed on the monument. The fact that this is a Wayeb date, associated by later Maya with dread events, may explain its elision here. A second *ha'b*—the internal elements resemble those of the sign, the second perhaps a syllabic ta—lead ineluctably to the half-baktun. The dates interweave with the beginnings of the Dos Pilas dynasty, perhaps by happenstance: the 9.9.13.0.0 is a few months after the birth of Bahj-laj Chan K'awiil on 9.9.12.11.2 in AD 625, and the final date only a few months after an event, an arrival (?), mentioned on the central stairway of Dos Pilas Hieroglyphic Stairway 2 (Fahsen 2002:Annex 1). The first stela erection involves an otherwise unknown lord who uses the Emblem (but without *k'uhul*, "holy") of Tamarindito and Arroyo de Piedra; the second is "for his god," presumably that of the lord mentioned at C1–C2. This is almost certainly the dedicatory date of Stela 16.

The imagery of the stela is matched only by two stelae, 1 and 6, at the site of Arroyo de Piedra, and by Panel 4 (labeled by Merle Greene Robertson "Stela 1") at Tamarindito (Figure 12.12). A lord stands in profile, facing to the viewer's left. His body is covered by the round markings of the "hero twin" 1 Ajaw, along with the same nighttime or *ak'ab* markings on his anklets and midsection; extruded eyeballs rim the hem of his skirt. Stela 16 at Aguateca and

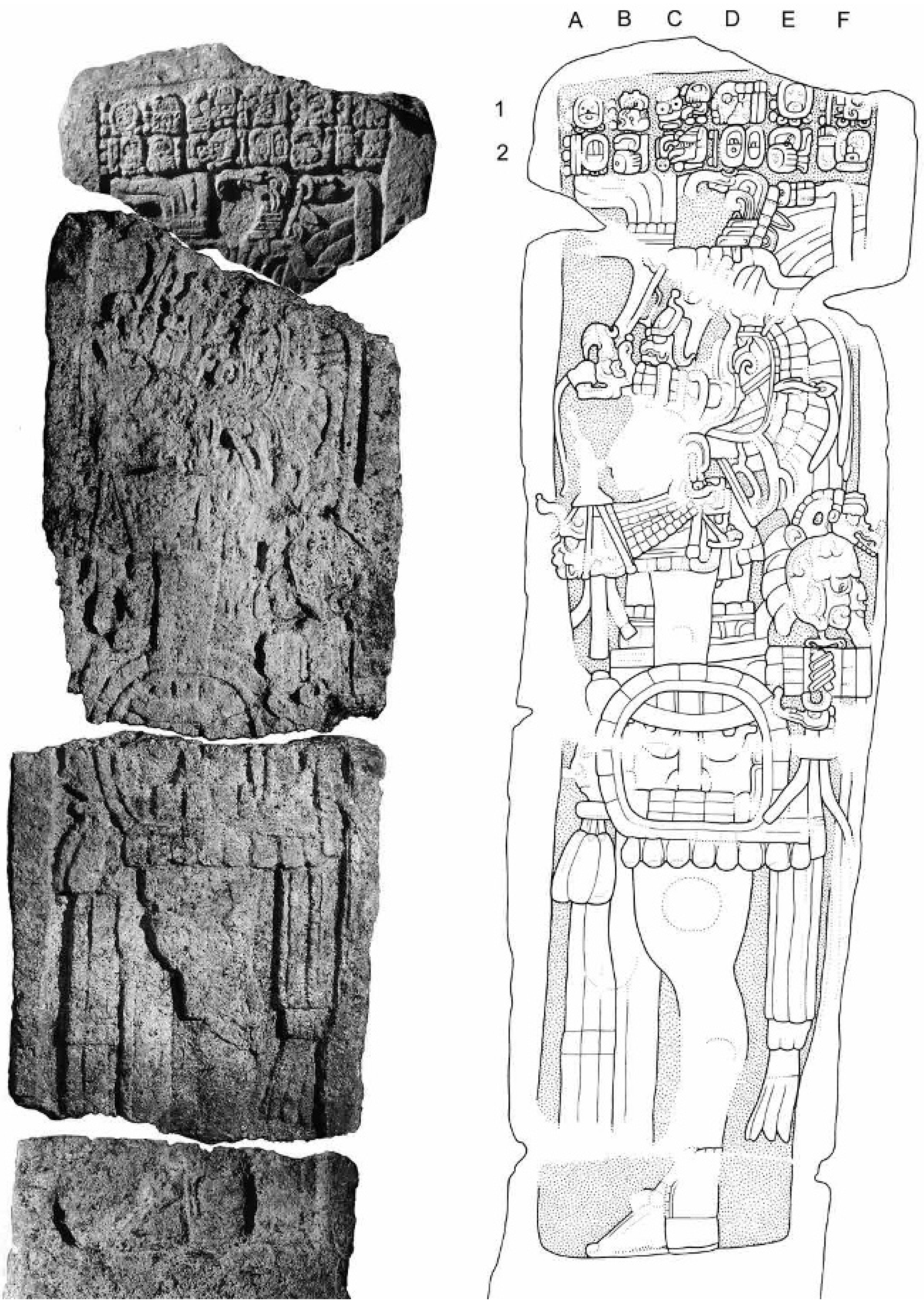


FIGURE 12.11. Stela 16. (Photograph by Takeshi Inomata; drawing by Stephen Houston)

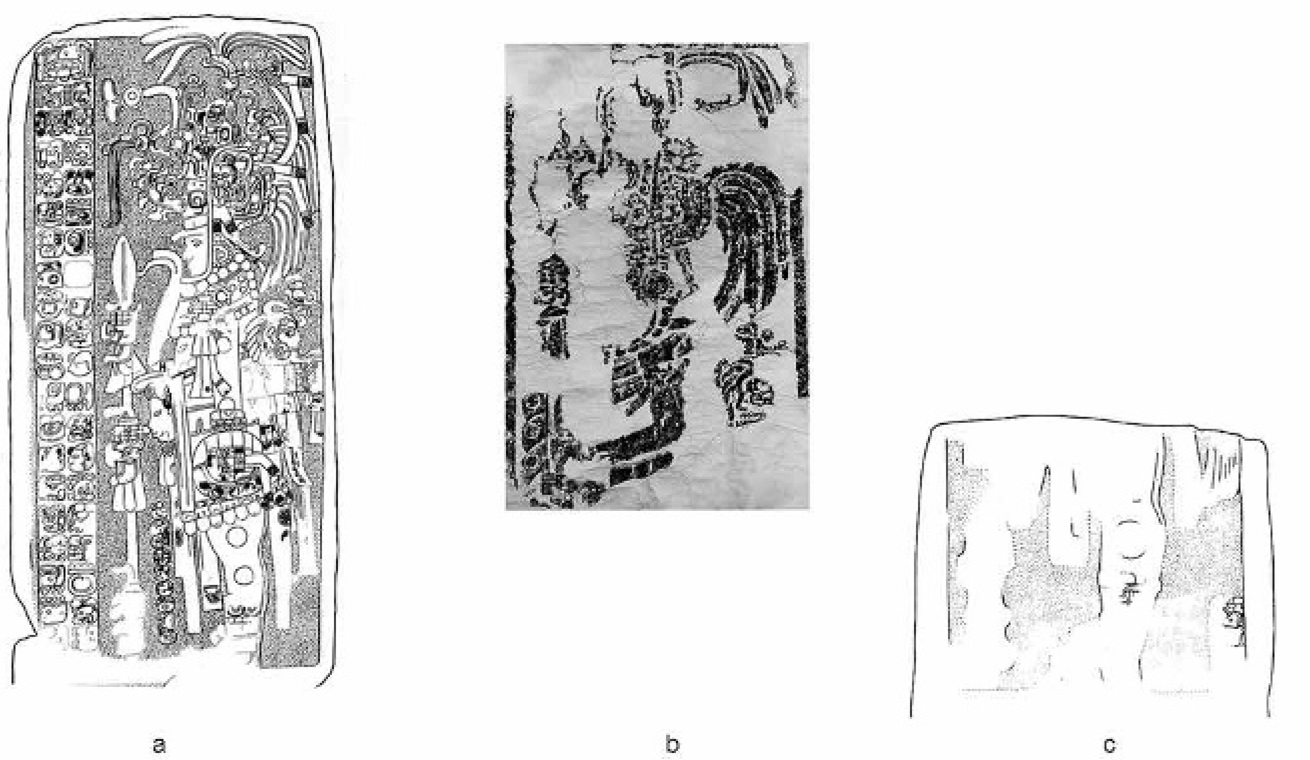


Figure 12.12. Monuments similar to Stela 16. (a) Arroyo de Piedra Stela 1. (Drawing by Ian Graham, courtesy of the Corpus of Maya Hieroglyphic Inscriptions program, Peabody Museum. © President and Fellows of Harvard University) (b) Tamarindito Panel 4. (Rubbing by Merle Greene Robertson, www.mesoweb.com/rub/, #D23768.PCT) (c) Arroyo de Piedra Stela 6. (Drawing by Stephen Houston, Houston 1993:Figure 3-4)

Arroyo de Piedra Stela 1 feature what may an identical shield, of a deity, Mok Chi, associated with incense, sacrifice, and drunkenness from mead (Grube and Nahm 1994: 707–708, Figure 44; also K2284 in the Kerr database of painted Maya vessels, www.mayavase.com). The even earlier, fragmentary Stela 5 at Tamarindito shows much the same dress and body markings (Houston 1993:Figure 3-5), as does, probably, Aguateca Stela 15 (see above). The same earspool occurs on the sculptures from Arroyo de Piedra and Tamarindito, and an identical backrack with a skeletal or jeweled bird atop a blood-drinking deity head adorns the sculptures at all three sites. At Arroyo de Piedra and probably at Tamarindito the depiction is of a well-known ruler, active, on Arroyo de Piedra Stela 1, at the same date as recorded on Aguateca Stela 16, 9.9.0.0.0 in the Maya Long Count (Arroyo de Piedra Stela 6 may refer to an earlier lord of the same name, and dates to 40 years before Stela 1 of that site). At the least, the stelae at Arroyo de Piedra, Tamarindito, and in this case at Aguateca refer to lords with the same Emblem—in a form distinct from the "curl" sign more usual to Aguateca. The sculptures share a similar range of dates and iconography, and possibly items of the same costume.

Stela 17 (Figure 12.13)

Stela 17 was found in the Barranca Escondida (Volume 1: Chapter 4). It was broken into three pieces, later thrown downslope by looters. It probably stood in front of the rock outcrop next to Stela 16. It is carved on the front side only. The carving is severely eroded, but a frontal view of a standing figure with a long, doubled-headed spear is recognizable. The stela does not have a legible inscription, but, in photographs, a ghostly text can be seen above the figure, with some squared blocks just visible to the upper left; it is possible, as suggested by Inomata, that the text was never finished. Although faint, the layout resembles that on Stela 16, to the extent that the figure could be readily interpreted as a frontal version of the same figure, with nearly identical costuming—note especially the long feathers or cloth to the side and back of the lord. Such resemblances indicate that the date may be close to that of Stela 16, at ca. AD 614. Its height above the lowest carved area is 2.06 m, its maximum width 0.98 m.

Stela 18 (Figure 12.14)

Stela 18 was discovered in the Barranca Escondida, perched on an outcrop north of the area where Stelae 15,

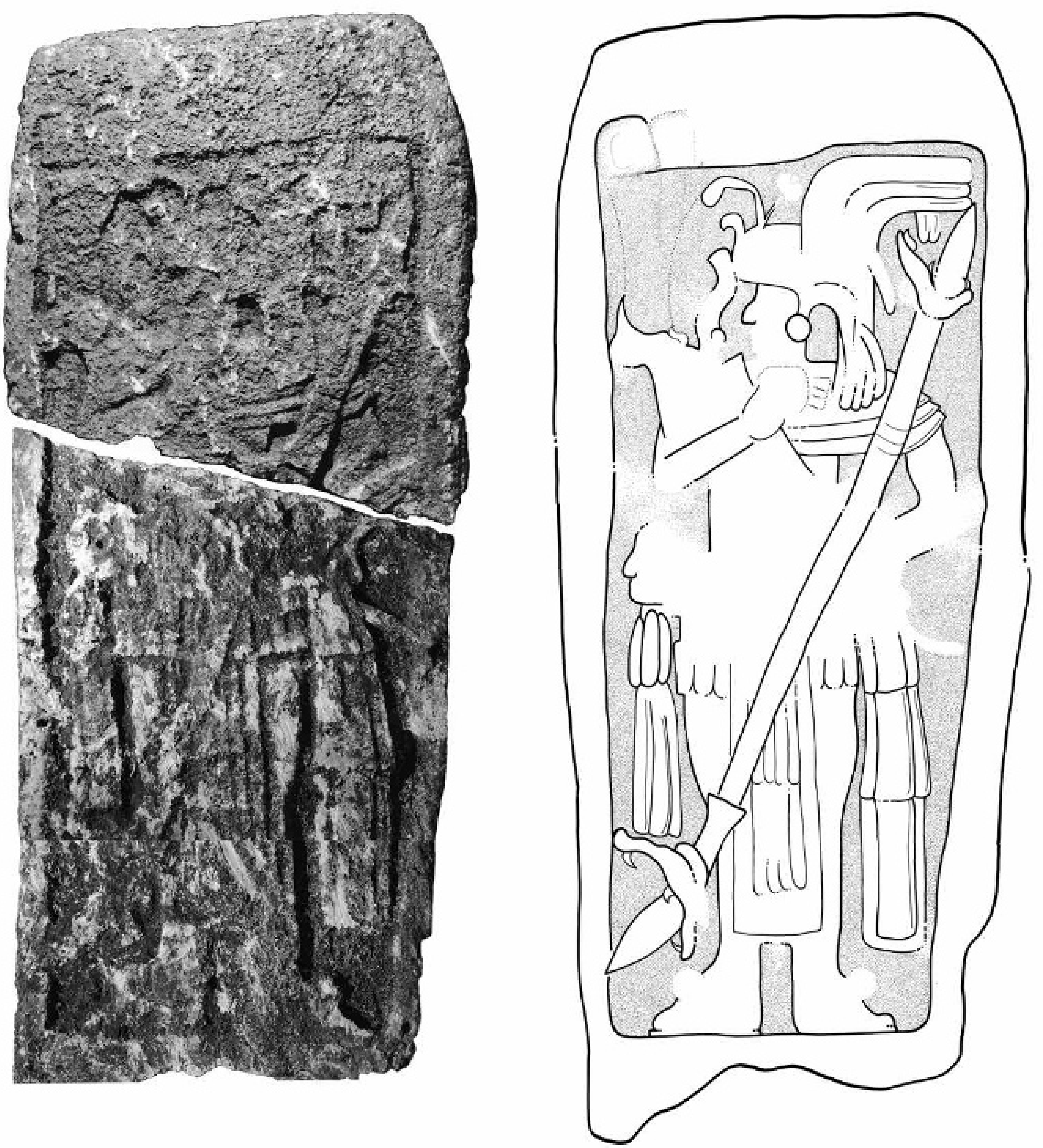


Figure 12.13. Stela 17. (Photograph by Takeshi Inomata; drawing by Markus Eberl)

16, and 17 were found. It fell face down and shattered into several pieces. The butt and midsection remained on the outcrop, but upper sections tumbled downward, perhaps to be removed by looters. The stela was carved on its front side, an eroded sculpture that displays the frontal view of a standing figure. The large, notched blade, probably from a double-bladed spear, is unique in the Petexbatun and Pasión corpus, as is the three-pronged eccentric flint held in the other hand. A fragment thought to come from the stela, in the upper left of the rendering, is of a centipede with a looped and bound hank of hair; its exact position on the sculpture is uncertain, however. The relatively slight

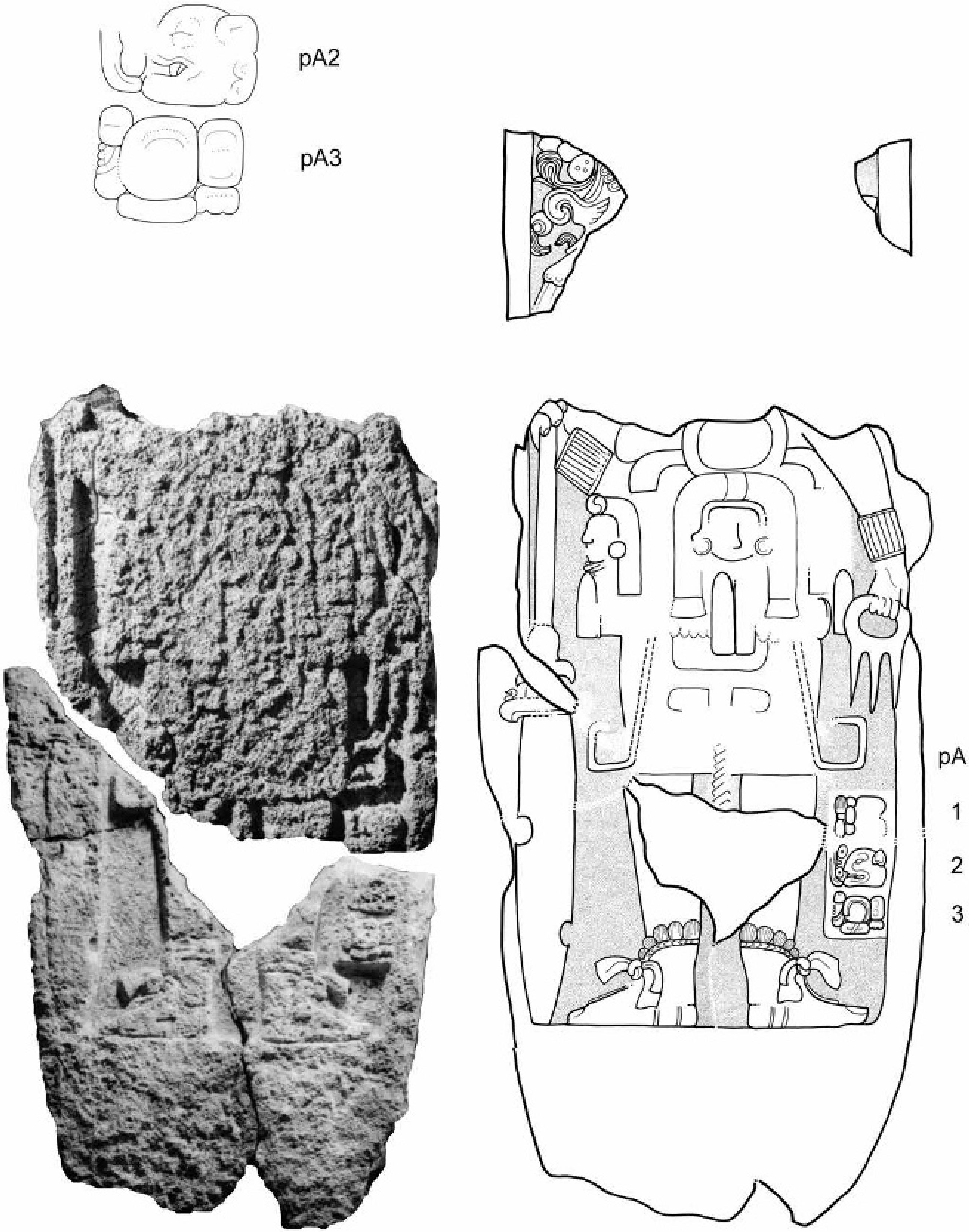


Figure 12.14. Stela 18. (Photograph by Takeshi Inomata; drawing by Markus Eberl; close-up drawing of glyphs by Stephen Houston)

thighs and shins, along with the scalloped, feathered edges of the sandals, differ from Tahn Te' K'inich's portraits, coming closer to the more delicate proportions of Ruler 4 or those on Panel 1 of Punta de Chimino, drawn by the author in 1989 (Houston 1989:Figure 6.7). The combined height of the remaining butt and midsection is 1.7 m; its width is 0.9 m, an unusually diminutive stela for the series at Aguateca.

pA1	**ma?-?**	?
pA2	**?-BAHLAM**	*?-bahlam*, "? Jaguar"
pA3	**'a-?-ta?-?-na?**	?

Clearly, the text was not the only one on the stela. The majority of the inscription must have been in the upper third of the monument. The little that survives bears no clear relation to other names at Aguateca. The disorderly alignment of the final glyphs at pA3 bears comment, too, for it violates the usual, rectangular outlines of glyph blocks.

CONCLUSIONS

The findings of the First Phase of the Aguateca Archaeology Project, with its trove of five new monuments and thorough documentation of others, augment the epigraphic corpus of the Petexbatun and Pasión regions in the final quarter of the Late Classic period. They confirm beyond doubt that Aguateca operated as the central citadel of the local dynasty, although much of its construction appears to coincide with the reign of a single ruler, Tahn Te' K'inich, who lived to ripe age. Earlier kings used the site, danced there, celebrated important Period Endings, erected now-missing stelae, but it was Tahn Te' K'inich who invested its main plaza with imposing monuments. They speak of war and a bellicose posture, yet because of capricious preservation, that landscape of hostility continues to be a cipher. On his stelae, antagonists are palpable in their agony, but, to our frustration, their places of origin elude any confident identification. As a general strategy, Tahn Te' K'inich appeared to dominate the Pasión region by indirect means, through lords, probably cousins or more general kin, who invoked the same dynastic god in crucial acts of witness.

The Barranca Escondida discoveries, among the most enigmatic in recent scholarship, will prompt debate for some time to come. Epigraphic scrutiny reveals that one stela uses another Emblem Glyph linked to a sometimes rival, sometimes subordinate dynasty that flourished for centuries in the northern reaches of the Petexbatun escarpment. None of the Barranca stelae show legible mention of a Dos Pilas/Aguateca king, and their scenes, at least two, probably more, of ritual dancing, occur elsewhere in open plazas alone, not in a broken, karstic setting like the Barranca (Volume 1:Chapter 4). It may be that the monuments are in primary context, erected at a time when Aguateca was controlled by another dynasty. This would accord with earlier ceramics found near the stelae, other evidence of long-term use, along with the Emblem on Stela 16 and the proof, at Ceibal, that sites could switch Emblems depending on dynastic fortune. Against this would be the dance themes on the stelae, which would be unsuitable for the Barranca; the variant style, including the stela that comes securely from the Late Classic period (Stela 18); and the absence of such unusual placement of sculptures at other Classic cities. The stelae linked to the Arroyo de Piedra or Tamarindito dynasty do not otherwise appear near caves or abysses.

With very few exceptions, unless reset, Classic Maya stelae occur on open plazas or near areas of wide movement, such as causeways. The exceptional, outlying stelae that seem to have defined the Copan valley occur in sectors of maximal visibility and open placement (Fash 1991: 101, 104). I recognize the merits of the opposing argument but favor the view that the Barranca sculptures are, in the main, not in primary context. Conceivably, they performed in part, within a period of conflict, as a Classic Maya analogue to the "houses of enemy gods," the *cōāteohcalli* attested among the Aztec, who gathered such effigies into a single temple (Durán 1967, II:439, 442), or, at Aguateca, in association with chthonic or cave-like locales. The analogy is buttressed by evidence that, in the Central Peten, the Classic Maya appropriated the effigies of enemy deities (e.g., Martin 1996:227–228). By an alternative interpretation, then, the Barranca housed royal effigies in stone, transported from some other setting to a clustering in an uneven outcrop under local, hostile control. Whatever the interpretation, the Barranca finds stand apart as singular monuments in the corpus of Maya texts.

chapter

13

Miscellaneous Texts

Stephen D. Houston

Maya writing offers content—glyphs to be decoded and texts to be parsed—but it also occurs in particular settings and at different scales. A stela with highly visible glyph blocks presents a different reading experience than a text on a bowl or bone. By Mayanist convention, smaller records of Maya writing are known as "Miscellaneous Texts" (MT), a precedent set by the Tikal Project of the University of Pennsylvania (Coe and Haviland 1982:59). The distinction is somewhat arbitrary, however, having more to do with prejudgments about separating monumental texts in stone from smaller ones or those in other media. Yet there is substantive merit to linking context, whether large and fixed or small and portable, to the detection of glyphic content; the former provides controls for interpreting the latter. As an example, consider the enigmatic "wing-*tuun*" glyph found at Aguateca and elsewhere (see below), often as prefix to a broader designation such as "bone" (*baak*). Although the reading is elusive, its presence on small, portable, possessable objects, many spatulate or elongated—or at least capable of receiving such shapes—points to a range of possible functions or meanings.

The inventory of MT at Aguateca is remarkably wide and full. This relative abundance, especially of the otherwise rare fragments of alabaster or calcite (Kubler 1977:n. 1), accords with the unusual conditions of sudden abandonment at Aguateca, along with the royal and palatial nature of the areas under investigation. The quality of the objects is exceptional. Whether incised or painted, the lines are fine and sure. In their carving, some of the materials demand no small degree of skill, particularly when sculptors had to deal with the thin, almost sugary calcite of the fragments assembled here. A sophisticated and discriminating audience required such expertise, a level of expectation implied equally by the dense and complex iconography on the objects of bone and shell. It would be surprising if the patrons and users were not at the highest levels of society. The glyphs, where legible, confirm such royal or elite ownership.

Ceramic Vessel

Fragments of a polychrome bowl (Cat. 310245) were found on the floor in front of the east room of Structure M7-22 (House of Masks) (22B2-3-2, Figure 13.1). The vessel has incurving rims and was almost certainly a receptacle for chocolate or atole; the restricted opening may have been designed to avert spillage of its valuable liquid. The interior, with scalloped border, resembles that of another pot at Aguateca, from Structure M8-4, said to come from the Ik' site (Inomata, Triadan, and Pinto 2010:229, 231, Figure 8.15d–h; for a useful and expert review of texts connected to this site, see Tokovinine and Zender 2012 and Just 2012). The scene on the exterior of the bowl, while fragmentary, displayed a historical image with courtly figures in elaborate dress. A stiff headdress invades the horizontal band of glyphs below the rim, and other feathers, also from a headdress, appear below the beginning of the text. The lower back of a courtier or ruler marks one sherd on the body of the vessel. Yet this is no generic scene. The specific date, very likely 12 Ix 12 Keh, 9.17.7.13.14 in the Maya Long Count, September 14, AD 778 Julian (position A1–B1), indicates a historically specific moment, especially when coupled with the palatial image. Indeed, such courtly tableaux are characteristic of vessels linked to the Ik' site (e.g., K1439, K1452, K1453, K1463, K1728, K1896, K2025, K2795, K3054, K4966, K5370, K5418, K6674, K8484, K8889, "K" referring to the Kerr Archive, http://research.mayavase.com/kerrmaya.html; see Reents-Budet 2007 and Velásquez García 2007, 2009 for thorough discussion). Other features include an unusual delicacy of linework and legible historical texts, the glyphs typically highlighted by pink or red pigment.

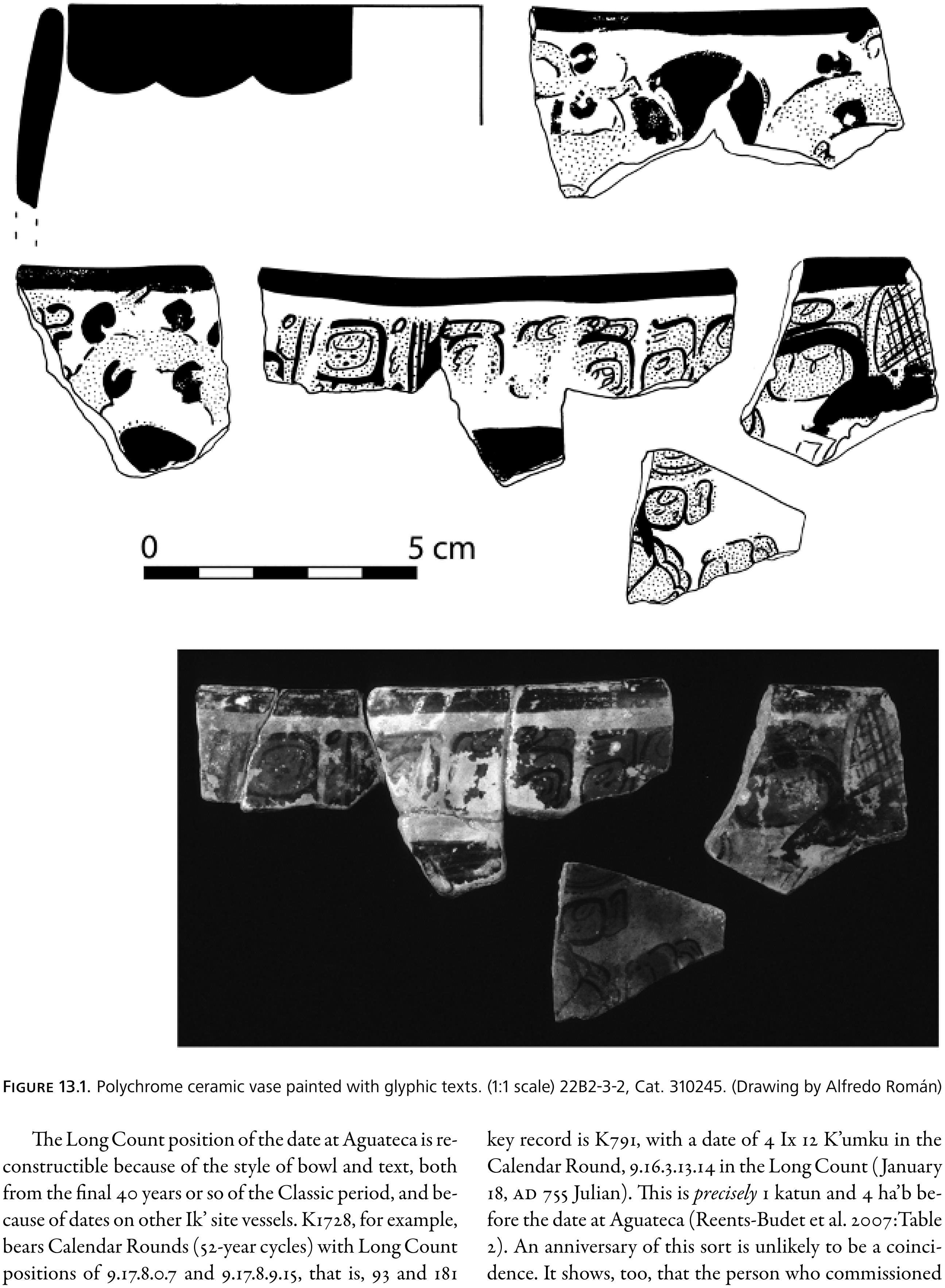


Figure 13.1. Polychrome ceramic vase painted with glyphic texts. (1:1 scale) 22B2-3-2, Cat. 310245. (Drawing by Alfredo Román)

The Long Count position of the date at Aguateca is reconstructible because of the style of bowl and text, both from the final 40 years or so of the Classic period, and because of dates on other Ik' site vessels. K1728, for example, bears Calendar Rounds (52-year cycles) with Long Count positions of 9.17.8.0.7 and 9.17.8.9.15, that is, 93 and 181 days respectively after the reference at Aguateca. Yet the key record is K791, with a date of 4 Ix 12 K'umku in the Calendar Round, 9.16.3.13.14 in the Long Count (January 18, AD 755 Julian). This is *precisely* 1 katun and 4 ha'b before the date at Aguateca (Reents-Budet et al. 2007:Table 2). An anniversary of this sort is unlikely to be a coincidence. It shows, too, that the person who commissioned the Aguateca bowl was probably Lamaw Ek', ruler of the

Ik' site, then in the final years of his life. The rest of the text at Aguateca is incomplete, but the *k'an* infix of the **BAAH** rodent is clear in photographs of the bowl, along with the **hi** suffix cuing vowel length in the logograph (Houston et al. 2004:86). The whole would have read **u-BAAH-hi**, *u baah*, "his portrait, body." This is an expression that often elucidates an image nearby, followed by the name of the person featured in the image (Houston et al. 2006:59–61). The next glyph, also clear in the photograph, is **mi-?** . . . , which recalls the beginning of an impersonation glyph (for an underworld deity) on K791, position M1, the vessel for which the Aguateca bowl records an anniversary. The Aguateca vessel may have commemorated a similar act of impersonation. The final sign in the rim text contains a semblant of the IK' sign, albeit with unclear suffix and curving, internal lines. Although aberrant, the glyph may refer to the Ik' Emblem glyph (cf. K1728, position V2). The glyphs below, on sherds that do not connect with the rim, read **?-? la-ja** and, in a second text, **?-?**. They probably served as captions to figures in the palatial scene.

The bowl at Aguateca alerts us to two possibilities. The first is that it served as an heirloom at the site or, at least, as an object created some decades before its abandonment. As such, it is one of the firmest indications in Maya archaeology for the "use-span" of fine vessels, which could survive a generation or more beyond their maker. The second possibility is that, for all the emphasis in Mayanist interpretation on display and the egoistical projection of elites, the bowl exhibits a detailed picture of a *different* court, without known attachment to Aguateca. Its value for the lords of Aguateca may have been more aesthetic than dynastic, a drinking vessel prized for its quality, not because of any sense of personal connection. For some years, scholars have known that the Petexbatun and Pasión River regions acquired pots from the Ik' site, if by unspecified means, perhaps as part of gifting or political networks. Examples occur at Altar de Sacrificios, Dos Pilas, Tamarindito, and Aguateca itself (see above; also Eberl 2003; Inomata 1997:Figure 15; Adams 1963, 1977 [if with mistaken attribution]; Valdés 1997:Figure 1). Nonetheless, rulers of the Dos Pilas/Aguateca dynasty had quarreled with the Ik' site a generation before (Martin and Grube 2008:62), which hints that some of the vessels had come to the area as war booty or tribute. Against this view is the curious frequency of Ik' pots in the Petexbatun region. Such density signals a more complex, sustained pattern of interaction than a single event or chain of events.

ALABASTER BOWLS

Among the rarest Maya objects are bowls made of single pieces of alabaster ("tecali"/calcium carbonate) or other white-stone ("marble"), some banded from cave deposition, others not (e.g., general [Luke 2008]; Bonampak [Tovalín Ahumada et al. 1999]; Caracol [Chase and Chase 1987:Figure 15a]; Chiapa de Corzo [Lee 1969:111, 114, Figures 67–68]; Chichen Itza [Moholy-Nagy and Ladd 1992:102–105, Figures 5.10 to 5.12]; El Abra [Riese 1984]; Palenque [Stuart and Stuart 2008:Figure 34]; Tikal [Shook and Kidder 1961:5]; Tonina [Becquelin and Baudez 1982:979–980, Figure 221; Becquelin and Taladoire 1990:Figure 168]; San José, Belize [Thompson 1939:167, Figure 92p]; Uaxactun [Kidder 1947:36–37; Figure 20]; Uxmal [Ruz Lhuillier 1954]; Yaxchilan [Kaneko 2003:64, Figure 84; Miller and Martin 2004:Plate 56]; and unprovenanced [Grube and Gaida 2006:Abb. 2, 3; Kubler 1977:5–13 (K4340); see also K1949, K4692, K7749, with comment by Marc Zender, http://www.mayavase.com/com7749.html]). A few such objects are attested thus far in the Petexbatun and Pasión regions (Willey 1978:Figure 93; also an unpublished fragment from the summit of Dos Pilas Structure L5-49, excavated by Joel Palka [Houston, personal observation, 1990]). The inventory from Aguateca augments the number substantially and includes a fragment recovered by Reiko Ishihara in the abyss of the site (AG31D-1-4). This collection may be the largest ever found. Unlike the "marble" objects in other sites, which derive from Honduras, those at Aguateca originated in the Maya Lowlands. Their legible texts and characteristically thin walls point to such a provenance. As shown by its local Emblem Glyph, one vessel comes from Aguateca or the other seat of the dynasty at Dos Pilas (see below). In general, the shape of the vessels is consistent with elements—bands, deep-cut carving, angled gadroons, horizontal cording, sharply everted rims, or constricted pedestal supports—that seem first to have appeared in wood. There is a chance that the bowls represent, at least in part, a process of skeuomorphic transfer from one medium (wood) to another (stone).

Dating: all such bowls from Aguateca come from the middle or end of the Late Classic period. A well-preserved rim (Figure 13.2a) exhibits the sharp eversion found on Late to Terminal Classic bowls of alabaster at Tonina and Yaxchilan (Becquelin and Taladoire 1990:Figure 168; Kaneko 2003:Figure 84, the latter dating to the late reign of Shield Jaguar III, just before AD 742; see also the example from near the tomb of the same lord [Miller and

Martin 2004:Plate 56]). In Maya thought, the color of such bowls, *sak*, "white," embodied human artifice, in vivid contrast to the green-blues and saturated reds ordinarily favored by the Classic Maya (Houston et al. 2009:32–33). As for function, dedicatory texts prove that most alabaster vessels were intended for the consumption of chocolate drinks or even headier brews (e.g., K4340). A bowl in the Ethnologischen Museum, Berlin, may show a supine figure in an enema pose, ready to receive an alcohol-filled clyster (Grube and Gaida 2006:Abb. 3.1; see K1550, K1890, K1896, K5011, K7525).

A name-tag for alabaster bowls appears in partially deciphered form on a vessel at El Abra, near Copan, Honduras (Aoyama 1999:Figure 1.13): **u-k'e-te-yu?** (or **u-te-k'e-yu?**) **bi-TUUN-ni**. The word for "stone," *tuun*, fits well, but other elements are more mysterious. Just before this passage are glyphs for "wood," **TE'**, and "obsidian," **ta-ji**, possibly in couplet form. An unconfirmed speculation would be that these refer in some fashion to the perceived properties of alabaster. Just after the name-tag is a reference to "dance," **AK'-ta**, that involved an object of tribute, *12 pat*, possibly the bowl. A performance such as this may account for a rendering of *tek'* in the El Abra text. In the vicinity of Palenque, the word conveys the meaning of "feet" (*ook*) that "step" (*tehk'aj*) in dance (Coe and Benson 1966:Figure 6). Perhaps alabaster bowls were not so much inert receptacles as active props in courtly ritual, including those of a vigorous sort.

At Aguateca, four fragments of alabaster bowls with glyphs were found in dense termination ritual deposits in and around the easternmost room of Structure M7-22 (House of Masks); another was recovered in the center room of Structure M8-13. Glyphs are incised on the exterior of the vessels. None of the pieces appear to form reconstructible vessels, although Cat. 22A698-1 and Cat. 22A711-1 may belong to the same bowl. It is unclear whether complete vessels were destroyed at the time of the enemy attack at Aguateca or whether they had been kept as valued and curated fragments. Either is possible: except in tombs, relatively few such bowls are ever intact. Most display the utmost delicacy, and clumsy handling would soon result in breakage.

Catalog No. 22A698-1 (22A9-3-2, Figure 13.2a) and Catalog No. 22A711-1 (22A6-3-2, Figure 13.2b)

The first vessel, a bowl with sharply everted rim and relatively straight sides, contains an inscribed euphemism for "death," **K'A'-yi u-? SAK-*IK'-*IL**, *k'a'ayi u ? sakik'il*, "it is finished his ?, his white breath" (see Fitzsimmons 2009: 27–33 for useful discussion). The month of this event, perhaps K'umku, comes just before. The name of the deceased would have followed. At least one other alabaster bowl from the area of Pajaral or Zapote Bobal (the Hix Witz sites) appears to have had a mortuary function (K4692), and the thought arises that the example at Aguateca was extracted from a tomb or used for mortuary repasts. Its possible companion (Figure 13.2b) has a longer text, albeit with smaller glyphs in columns rather than the row of the death expression. The rim band text prioritizes the most relevant information, that someone had died on such-and-such a day; the columns amplify that information in some way or gloss an accompanying image, now lost. Unfortunately, most of this secondary text is opaque. It was probably read in double columns. A pedestal for the day sign occurs in the upper, surviving block (pB1); presumably a month followed, but it is now missing. The signs at bB2 are uninterpretable, other than the hand with "1" superfix, a combination of glyphs that is very similar to Copan Stela F:A10 and La Corona Hieroglyphic Stairway 2, block III:B2, the latter in the title sequence of a ball player (La Corona numeration by David Stuart). The remainder of the text offers greater clarity (pA3–pB4): **. . . ?-?-na BOLAAY?-yi AJ-16-BAAK-ki . . . ? . . . ?-AJAW ba-*ka-*ba**. The count of captives (*n* = 16) is unusually high for the Petexbatun region, which favors <5, but it recalls the norms of the Usumacinta, where such counts are elevated (Martin and Grube 2008:130–131). The lord was of ajaw status but did not clearly carry a full Emblem Glyph. Possibly the vessel was made at Aguateca or an allied site, but there is no proof of it, and some suggestion—the unusual count of captives—that it was not.

Catalog No. 22A2038-1 (22A12-3-1, Figure 13.2c)

In contrast, the fragment illustrated in Figure 13.2c was surely crafted at Aguateca or Dos Pilas: the Emblem Glyph (**K'UHUL-MUT-AJAW**) at pA2 is the later version of the title, post-AD 735 (Houston 1993:Figure 4-1). The glyph above, at pA1, appears to have a preposed "3," perhaps with a count of captives that pertains to the last lord of the site, Tahn Te' K'inich (cf. Aguateca Stela 7:C1).

Catalog No. 22A2037-1 (22A9-3-4, Figure 13.2d)

Toponymic glyphs begin the text (aB1–aA2): **?-HA'-'a ?-CH'E'N-na**, *?ha' ch'e'n*, "? water-?-place." *Ha'* or "water" place names are attested locally—Dos Pilas for one, *Chak Ha'* too (Stuart and Houston 1994:19, Figure 43)—but

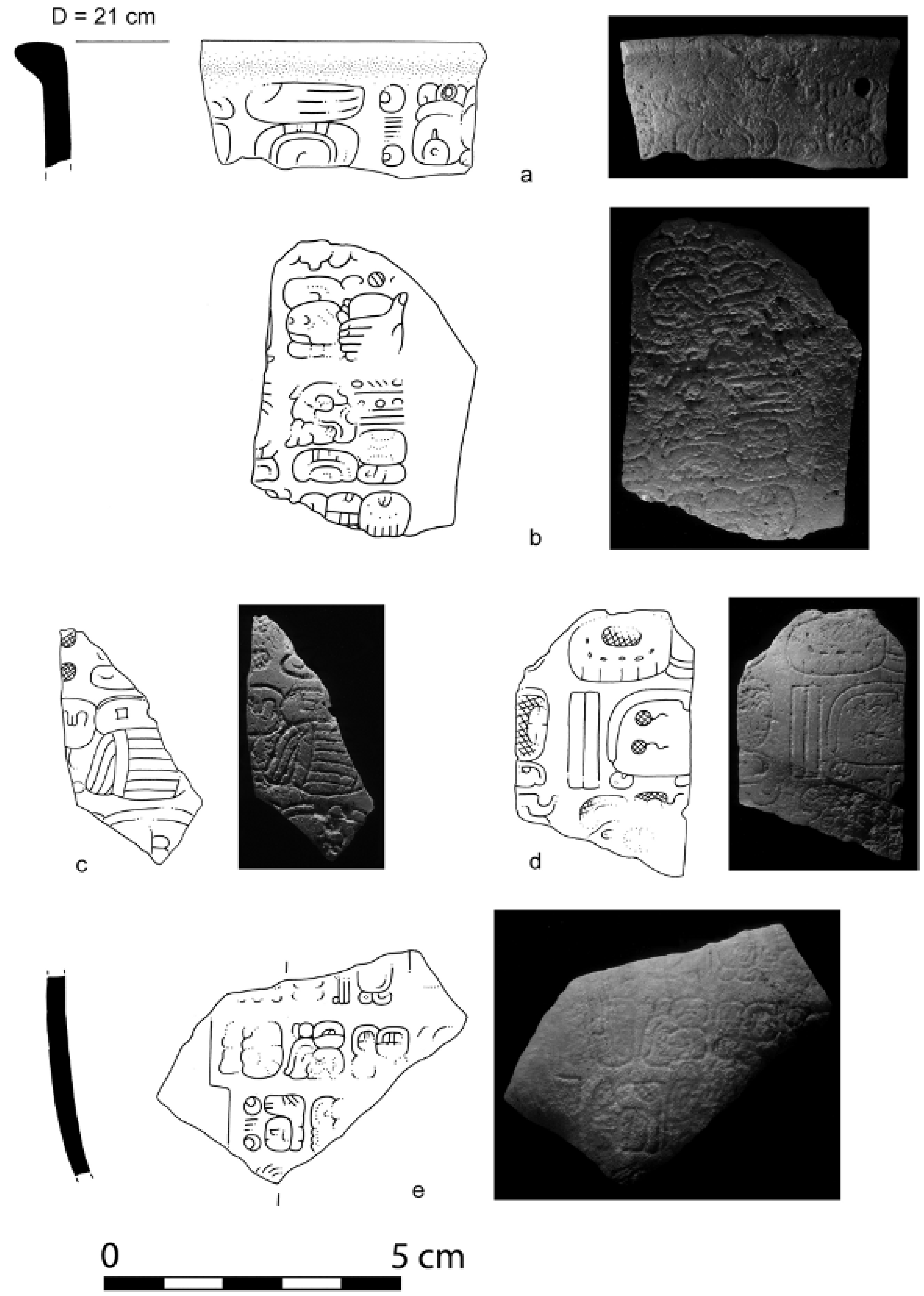


FIGURE 13.2. Glyphic texts carved on alabaster vessels. (1:1 scale) (a) 22A9-3-2, Cat. 698-1. (b) 22A6-3-2, Cat. 711-1 (a and b are probably parts of the same vessel). (c) 22A12-3-1, Cat. 2038-1. (d) 22A9-3-4, Cat. 2037-1. (e) 14B20-1-2, Cat. 711-1. (Drawings by Stephen Houston)

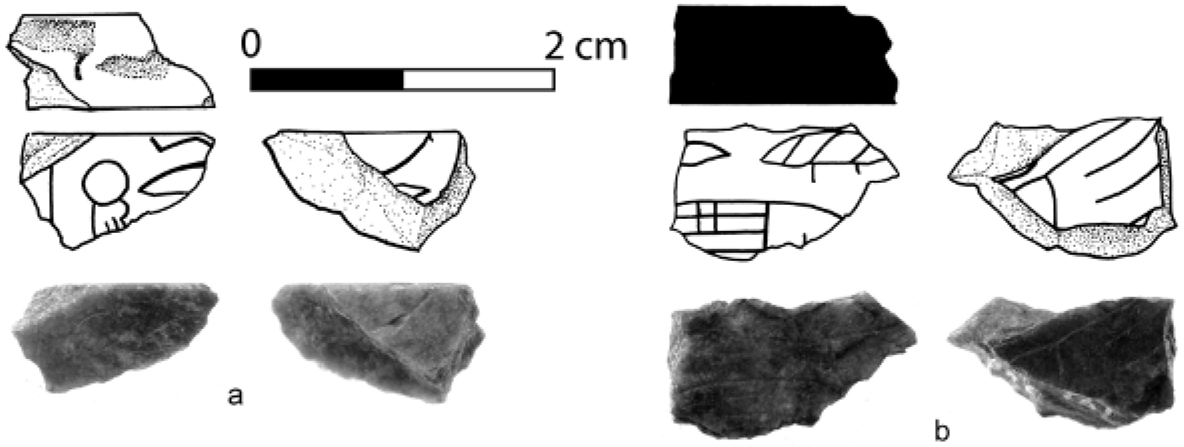


Figure 13.3. Glyphs on polished stone fragments, showing two sides. (2:1 scale) (a) 24B5-2-1, Cat. 236-1. (b) 24B6-2-1, Cat. 192-1. (Drawings by Markus Eberl)

there is no way of demonstrating their presence here. The signs at aB2 may spell **10-LAKAM-la**, a puzzling construction, but the presence of probable K'umku in the following block, at aA3, hints at another possibility, that the sign forms a highly aberrant day sign of 10 Kaban. This interpretation accords with the verb that follows, in expected position after a Calendar Round: **PUL-yi**, *puluyi*, "it gets burned," usually a bellicose event. Yet, to be sure, the day sign would be an exceptional, even unacceptable, anomaly. The final phrase remains a mystery.

Catalog No. 14B711-1 (14B20-1-2, Figure 13.2e)

The text, of unusually small size, reads in single rows, not the double columns in the preceding fragment. The irregular outline suggests a mat-like, perhaps sloping layout also seen on a carved human skull at Aguateca (Inomata 1997:Figure 13). The text is largely illegible because of erosion, but a few signs are recognizable on the fragment—a "13" at pC1, perhaps with a Pop month, an **'i** at pC2, an **U-K'ABA'-'a**, *u k'aba',* "his, its name," at pA3, along with a probable Emblem Glyph at pC3.

Polished Stones

Two small fragments of polished gray stone were found on the rock outcrop in the Barranca Escondida (24B5-2-1, Cat. 236-1; 24B6-2-1, Cat. 192-1) (Figure 13.3). They were probably part of the same object and, like many other stone ornaments found in the area, may have been smashed in a ritual that was held there. They are well polished and incised with fine lines on both sides. Unfortunately, none of the elements is identifiable, yet a few, as in Figure 13.3b, left—an early form of the **la** syllable? (cf. Dumbarton Oaks Jade Plaque:pA3, K2389b)—gesture to the initial years of the Early Classic period.

Carved Bones

Two carved long bones, probably of deer, were found in the easternmost room of Structure M7-22 (House of Masks). Smaller pieces of carved bones were retrieved from the area in front of Structure M8-2 and from Structure M8-4 (House of Mirrors). The masterwork, bursting with taut energy and twisting forms, appears in Figure 13.4. Bone spatulae of comparable form are attested at many sites, often, when carved, from the final quarter of the Classic period (e.g., Altar de Sacrificios [Willey 1972: Figure 202a–c]; Copan [Schele and Miller 1986:Plate 50]; Dzibilchaltun [Taschek 1994:Figures 35k, 36b–c]; Tikal [Moholy-Nagy 2003a:Figures 123f, 125]; Tonina [Becquelin and Taladoire 1990:Figure 175c]; Uaxactun [Kidder 1947:Figure 41b]; Yaxchilan [Miller and Martin 2004: Plate 56]). Their function continues to baffle. The polished and incised bones do not seem to have been sharp enough to operate as punches or with sufficient grooving to serve as effective scoops. Weaving bones or picks tend to be thinner, flatter, and more pointed (Dacus 2005). Nor would the blunted examples here do adequate work as gladiatorial weapons, of the sort pictured on at least one Maya alabaster vessel (K7749; http://www.mayavase.com/com7749.html). Possibly they served as scepters—some would fit a hand comfortably—or as elements inserted into headdresses or coiffures. Most conform to a subset of such bones with imagery in the widest, uppermost portion, glyph blocks below. Without exception, the texts are name-tags, designations of ownership for the objects.

Catalog No. 22A524-8 (22A10-3-2, Figure 13.4)

This carved long bone was found on the floor in front of the bench in the easternmost room of Structure M7-22. It was probably part of the regalia of the last ruler, Tahn Te' K'inich, and was stored in the sealed room as a complete object. It appears to have broken when the structure collapsed in fire, burning to varying colors of brown, black, gray, and white. The fragments exhibit different degrees of damage, suggesting that they continued to receive heat after the breakage. The iconography involves an apparent fusion of identity between deity and lord (the owner?). The main figure holds a long spear that has entered and sliced the flesh of a monstrous fish or shark. In the shark's mouth is another figure, not so much the shark's prey as an aspect of its identity. The standing figure has both a "jester god" (a so-called *hu'n*, "paper," jewel), a token of rulership, and the distinctive ear covering (a shell) of Chahk, the rain god, a deity known for his abundance of hair (García Barrios 2008:33); note here the locks to the side of the face and other strands extending upward. The god's beard expresses ancestral status or great age (Houston and Inomata 2009: Figure 7.13). Below the scene are two bands of water, an expected frame for a scene of watery hunt and butchery. The uppermost shows the dots of variable size that represent surging water (Houston 2010:71); those below, with cross-hatching to suggest a dark appearance, denote drops of water (rain?), along with hints of star signs. This hunt, which ends badly for the shark, embroiders Maya myth. It may show the release of primordial waters as bloody effusions from the quarry—a compelling explanation for the saline taste of sea water, Chahk being the fisherman (Taube 2010:209–210).

Similar scenes appear on a number of Classic Maya vessels, including a much fuller exposition on a vessel in Boston (K595, Museum of Fine Arts 1988.1255). Chahk grasps the hair of a person, body now visible, within a monstrous fish. The text nearby describes the victim's fate, *juhlaj*, "spearing," on the Calendar Round 3 Ik Seating of Xul. The date resonates with the many Ik' dates in mythic time at the site of Palenque (Stuart 2006:77–78). By no coincidence, the number "3" is also associated with the deity associated with wind, *ik'* (Taube 1992b:63). Four other, smaller Chahk perch nearby, ready to assist in combat. One lifts a stone, two others grip spears, like the main assailant; a fourth holds an ax. As a god, Chahk inclines to quadripartition and assignment to four cosmic directions; here the largest god may represent the cosmic center point, a fifth location. A second, related vessel at Dumbarton Oaks conveys the varying richness of Maya myth by substituting an aspect of the Sun God for Chahk, now with another deity, already gorging on blood (Carter 2010:246). As with comparable bones, especially one found at Copan, the scene is "concurrent," depicting deities in mythic time and location (the Maize God and K'awiil at Copan, standing on the sky itself), but with more than a suggestion that historical figures had fused with mythical beings (e.g., Schele and Miller 1986:Plate 50a).

The text of the bone is relatively clear. It begins with a name-tag, a reference to a lord's ownership of the bone. The name-tag is not deciphered, but it is found in other contexts with precisely the same referent: (1) an example from Group C10 at Piedras Negras, here adding "bone," *baak*, to the name-tag, in appropriate reference to its material—above is a ruler embodying a specific Ajaw date (Houston et al. 2000:Figure 7); and (2) another from Dzibilchaltun, also with a mythic scene, if less identifiable, with the same name-tag, prefixed with the possessive *u* and the name of its evident owner, *k'uh*, the "god" (Taschek 1994:Figure 36b). More enigmatic is the so-called Squier Jade at the American Museum of Natural History, New York (AMNH-Anthro #30/83, acquired 1896; Squier 1869:Figure 9; Easby 1961). Clearly from Dos Pilas, Guatemala, insofar as it refers to a ruler of that site, the name-tag names a large jade bead (Martin and Grube 2008:57). The discrepancy of shape and material makes little sense. What is just as difficult is a reading of the name-tag itself. As David Stuart suggests to me, it may represent an undeciphered logograph, not two syllables (**k'i** and **ku**), or a combination of syllable and logograph (**k'i** and **TUUN**). The remaining glyphs are somewhat clearer, but with continuing problems of interpretation: **TAHN-LAM**, *tahnlam* (a half-period of time); **ch'o-ko**, *ch'ok*, "youth"; **yu-ne-?**, possibly *y-une-?*, "his baby/child" (Martin and Grube 2008: 77); **MO'?-AJAW-wa**, *Mo?' ajaw*, "macaw?-lord"; and **LAKAM-AJ-KOHKAN?-xi** (see Zender for possible reading of "stingray spine," http://www.mayavase.com/8713/com8713.html). Suppositions: the bone belonged to a youth (*ch'ok*), perhaps linked to a unit of time (the *tahnlam*) or the recipient of this bone at the conclusion of a calendrical cycle; and the youth was the offspring of a king or high-ranking lord. A large number of precious objects among the Classic Maya were given to high-ranking youths during rites of passage (Houston 2009:165). This may have been the social context for the Aguateca bone, as, perhaps, with a few other objects at Aguateca (e.g., Inomata 1997:Figures 13, 14). However, the bone did not come demonstrably from Aguateca, in that the royal title does not belong to any known site in the region.

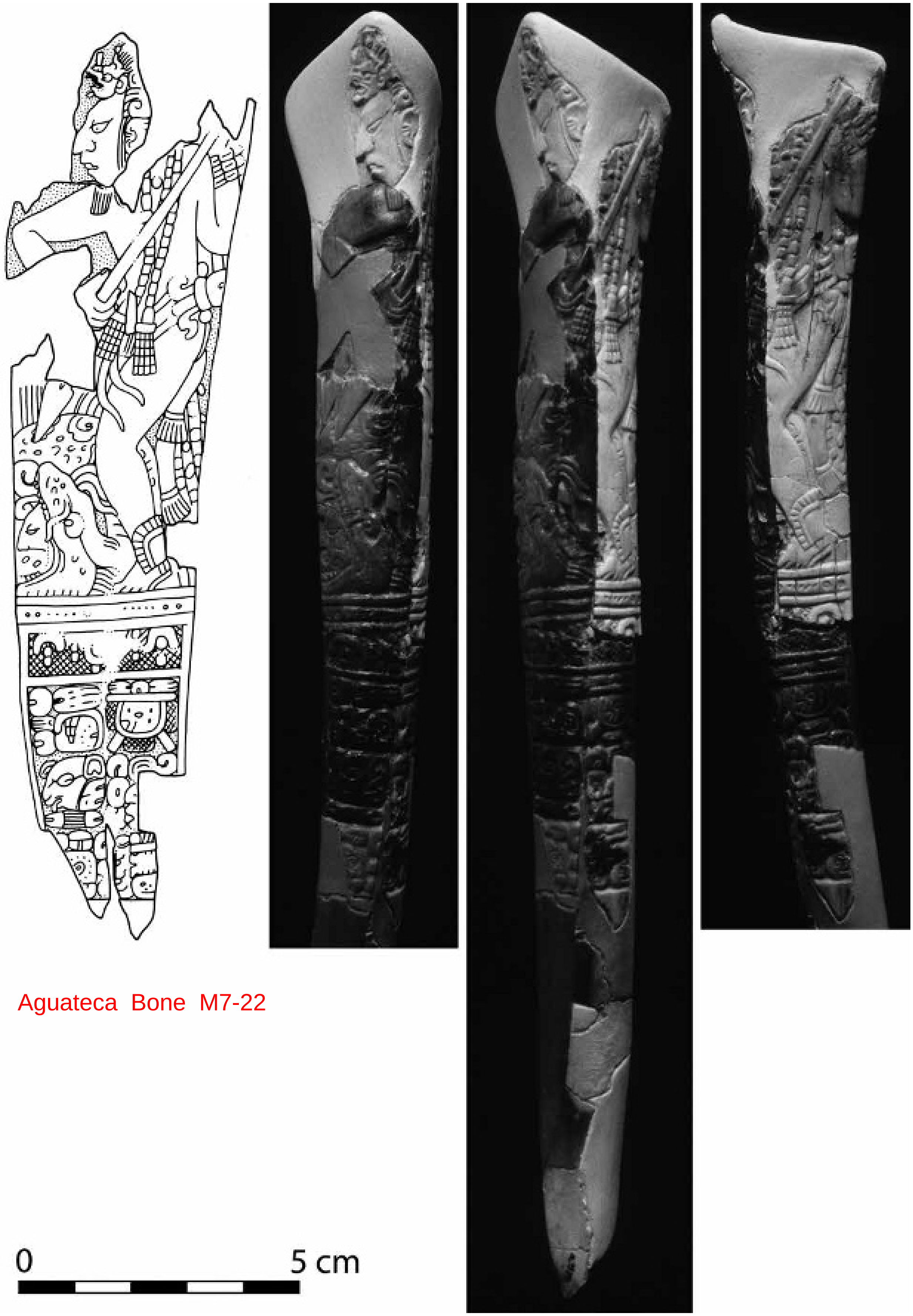


FIGURE 13.4. Carved bone. (1/1 scale) 22A10-3-2, Cat. 524-8. (Drawing by Stephen Houston)

Catalog No. 22A332 (22A14-2-5, Figure 13.5)

This carved long bone was also discovered in the easternmost room of Structure M7-22, mixed in wall fall in front of the bench, close to the floor. Like Cat. 22A524-8, it probably broke when the structure collapsed, but its white color indicates that the object was burned even more severely. Less can be said of the iconography, other than that it shows a courtly personage, standing, hand raised. The glyphs are similarly unrevealing. What must be a name-tag reads **u-ka-chi**, *u kaach*, perhaps a term for "rope" or "tie" (Grube 1992:213), yet the context does little to explain the term. Another fragment of text may spell **?-'e-TE'**, again without clear meaning.

Catalog No. 23B191-1 (23B23-1-2, Figure 13.6a)

This fragment of bone was found in the area in front of Structure M8-2. The style is less refined (later?) than the other texts in this assemblage, with a possible **k'u** syllable at pA2.

Catalog No. 23A1121-7 (23A13-3-1, Figure 13.6b)

This fragment of carved long bone was found on the bench of the center room of Structure M8-4. It is burned gray and black. The first glyph is the same name-tag as on Cat. 22A524-8, but now with superimposed **BAAK**, *baak*, "bone," over the "kawak" sign in the other examples. The next sign, at A1r, may be a variant of the "guardian" expression that indicates control over a person, although what should be the U sign is a highly unusual, even unique, form. The reading involves a homophone of "snake," *kaan* or *chaan*, with the notion of "guarded thing," if with some uncertainties of interpretation. Logically, the name of the captive or guarded thing follows, at A2, **?-ha-na**. The first glyph of this compound is another aberrant form, combining the glyph for **K'UH** with what may be a sign for "20," but neither is a secure reading. The final glyph block, at A3, situates this bone, too, within the courtly life of royal youths: **ch'o-ko mu-MUT-AJAW**, *ch'ok mut ajaw*, "royal youth of the Mut (the royal family of Aguateca)"; the *mut* reading was proposed in the early 1990s by David Stuart, on the basis of syllabic clues—preposed **mu** and postfixed **tu**—at Aguateca, La Amelia, and Yaxchilan. The bone thus belonged to the heir of the local dynasty, suggesting that he had already taken a war captive.

Catalog No. 23A1121-1 (23A13-3-1, Figure 13.6c)

This small fragment was discovered near Cat. 23A1121-7, on the same bench. It is burned to a white color and records the title of the heir, **mu-MUT-AJAW**, *mut ajaw*, "Mut lord (the royal family of Aguateca)." If it were a ruler rather than a youth, the scribes would most likely have prefixed the "holy," *k'uhul*. That adjective is absent here.

CARVED SHELLS

One carved conch and a small shell fragment were recovered from Structures M7-22 (House of Masks) and M7-32 (House of Bones).

Catalog No. 22A647-10 (22A14-2-6, Figure 13.7)

This large marine conch was found in front of the bench of the easternmost room of Structure M7-22. It was mixed in the wall fall near the north wall of the room (see Figures 2.4c and 2.18e in Volume 1) and appears to have fallen from a high location where it was originally stored as a complete piece. It was burned to a dark hue and smashed by collapsing stones. A substantial portion of the shell was not recoverable, as it had delaminated into small fragments. A Maya artist cut edges on the conch, smoothed its surface, and then made fine incisions to pick out a scene and accompanying text.

The image is badly damaged but can be elicited from the text (Figure 13.7c): **?-ya-la-ji-ya hu-bi ?-?**, *y-ala-j-iiy huub ?*, "…his saying, the conch…" (see Barrera Vásquez [1980:238], "caracol marino"; see Grube [1998], on such expressions, with an independent presentation by Houston and Stuart [1993]). The glyphs accord with a distinct genre of Maya writing, a near-folkloric evocation of encounters between mythic beings that claims also to record snippets of their conversation. The text is reportorial—"such was said"—yet savors of hearsay and storytelling. No great imagination is needed to hear the voice of a performer, reading aloud and speaking of distant times and fables with cues from the object itself. Another attribute is the self-referential nature of the shell. Much like a similar text on the Cleveland Shell (Schele and Miller 1986:115, Plate 59; Doyle 2010:114; see also K8885), a conch is said to speak to another being, a deer or deer-man in the case of the example at Cleveland. The conch in question is probably referenced by the very object on which the texts appear, establishing a veridical basis for the account to be read, recounted, and believed. The glyph that follows the term for conch is a sign, a polished hardstone, that introduces the heads of certain deities (Dos Pilas Hieroglyphic Stairway 4, Step V:L2 [Houston 1993:Figure 4-11]; Tikal Temple IV, Lintel 3:F5 [Jones and Satterthwaite 1982:Figure 74]). The identity of the god is uncertain, but one

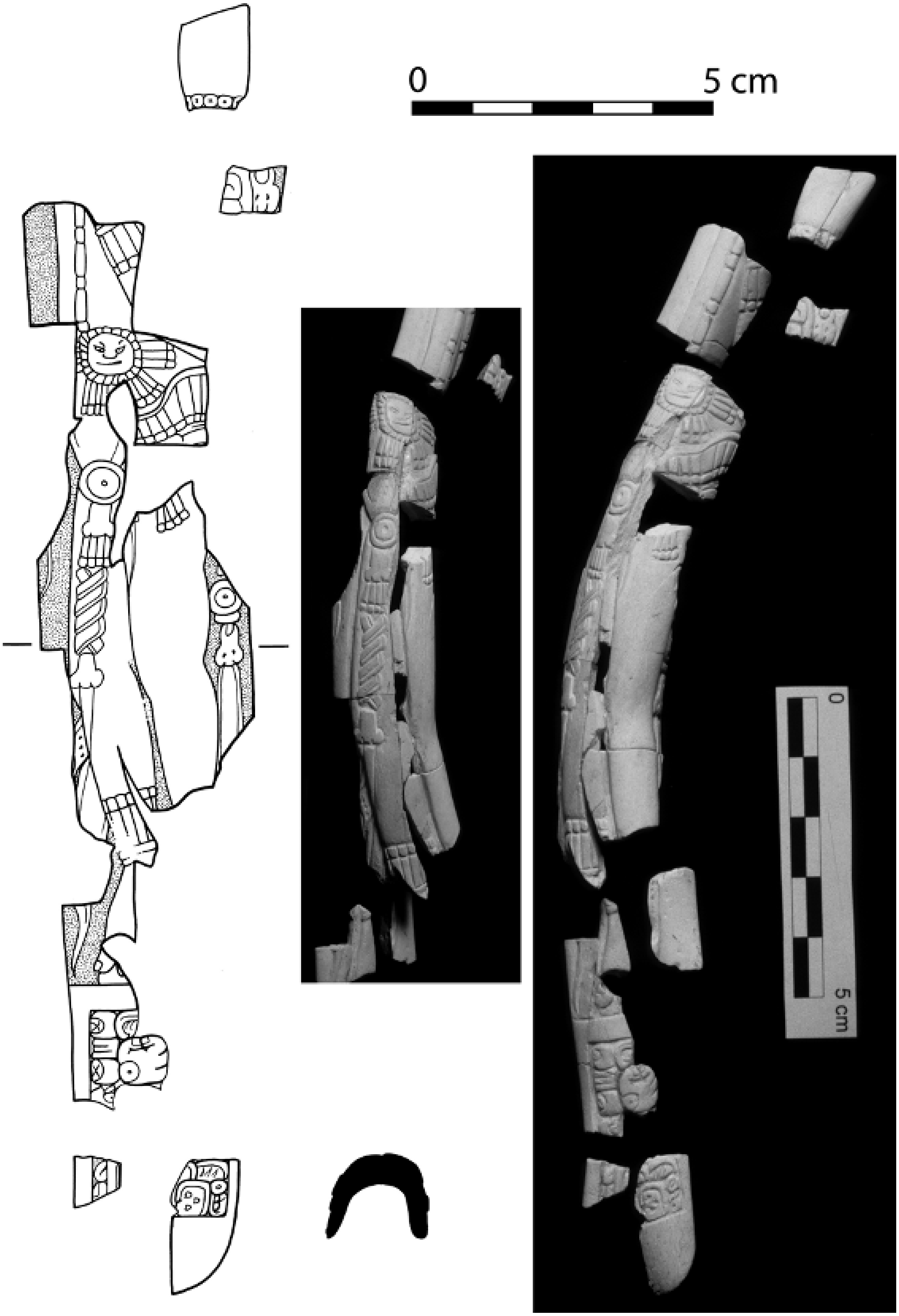


FIGURE 13.5. Carved bone. (1/1 scale) 22A14-2-5, Cat. 332-2. (Drawing by Markus Eberl)

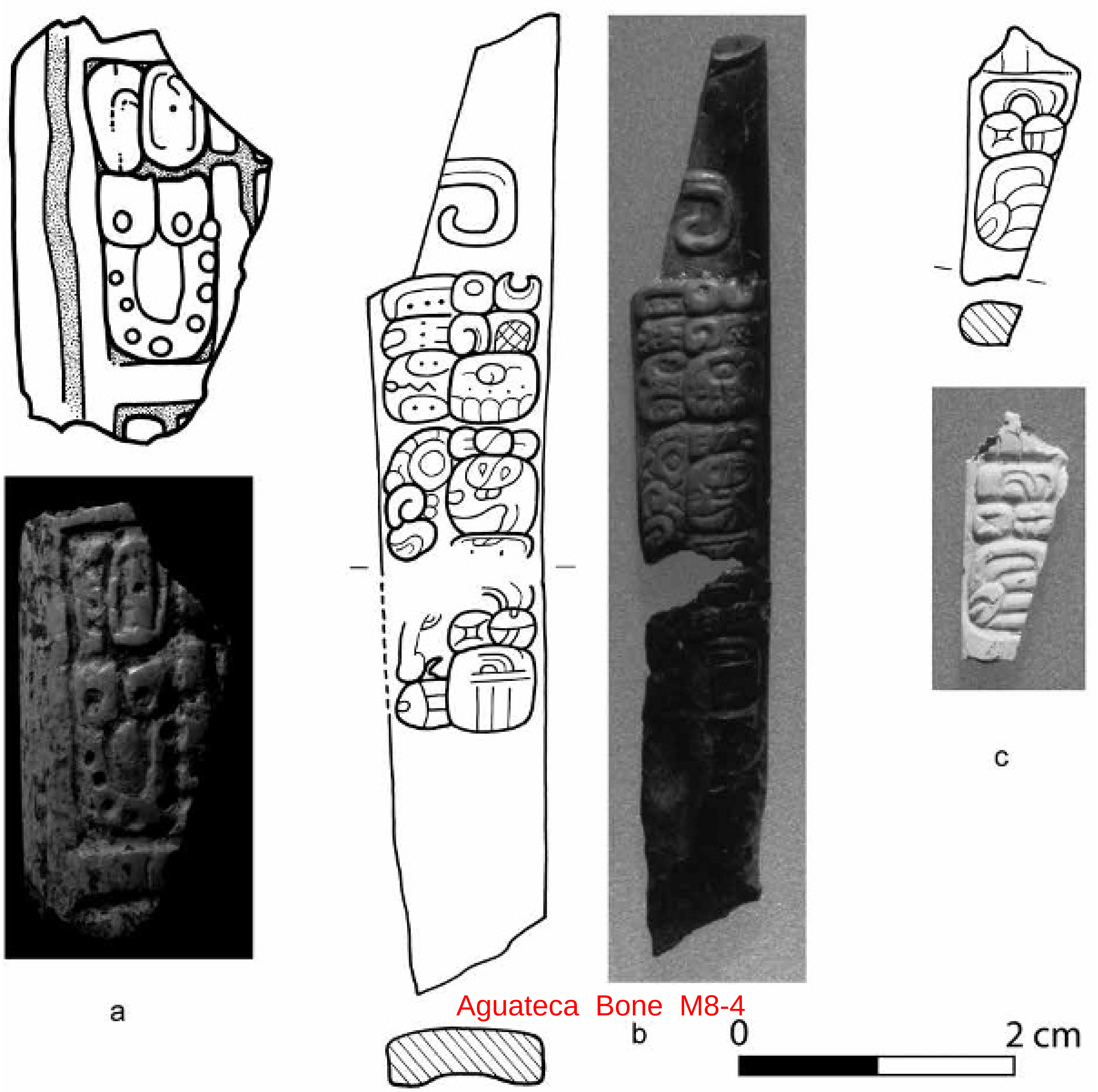


FIGURE 13.6. Carved bone fragments. (2:1 scale) (a) 23B23-1-2, Cat. 191-1. (b) 23A13-3-1, Cat. 1121-7. (c) 23A13-3-1, Cat. 1121-1. (Drawings by Markus Eberl)

nonhuman figure, in the arm-clasped position of a subordinate, appears in Figure 13.7b. A centipede may arch in Figure 13.7c. A glyph, **ba**, floats in an orphaned manner nearby on yet another fragment (Figure 13.7f).

Catalog 22B544-1 (22B43-3-4, Figure 13.8)

This small delaminated fragment of shell was found in the dense termination ritual deposit in the front room of Structure M7-32 (House of Bones). The text contains the MUT of the Aguateca Emblem Glyph and a probable **u-ba-hi**, *u baah*, "his image, portrait" thereafter, perhaps as part of a parentage statement.

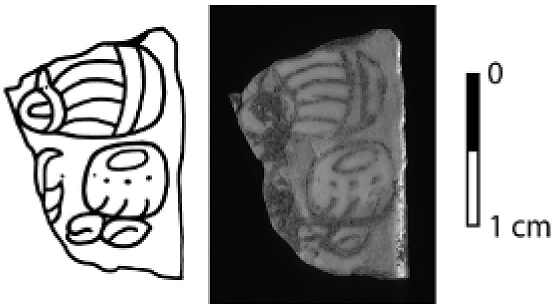


FIGURE 13.8. Carved shell. (2:1 scale) 22B43-3-4, Cat. 544-1. (Drawing by Markus Eberl)

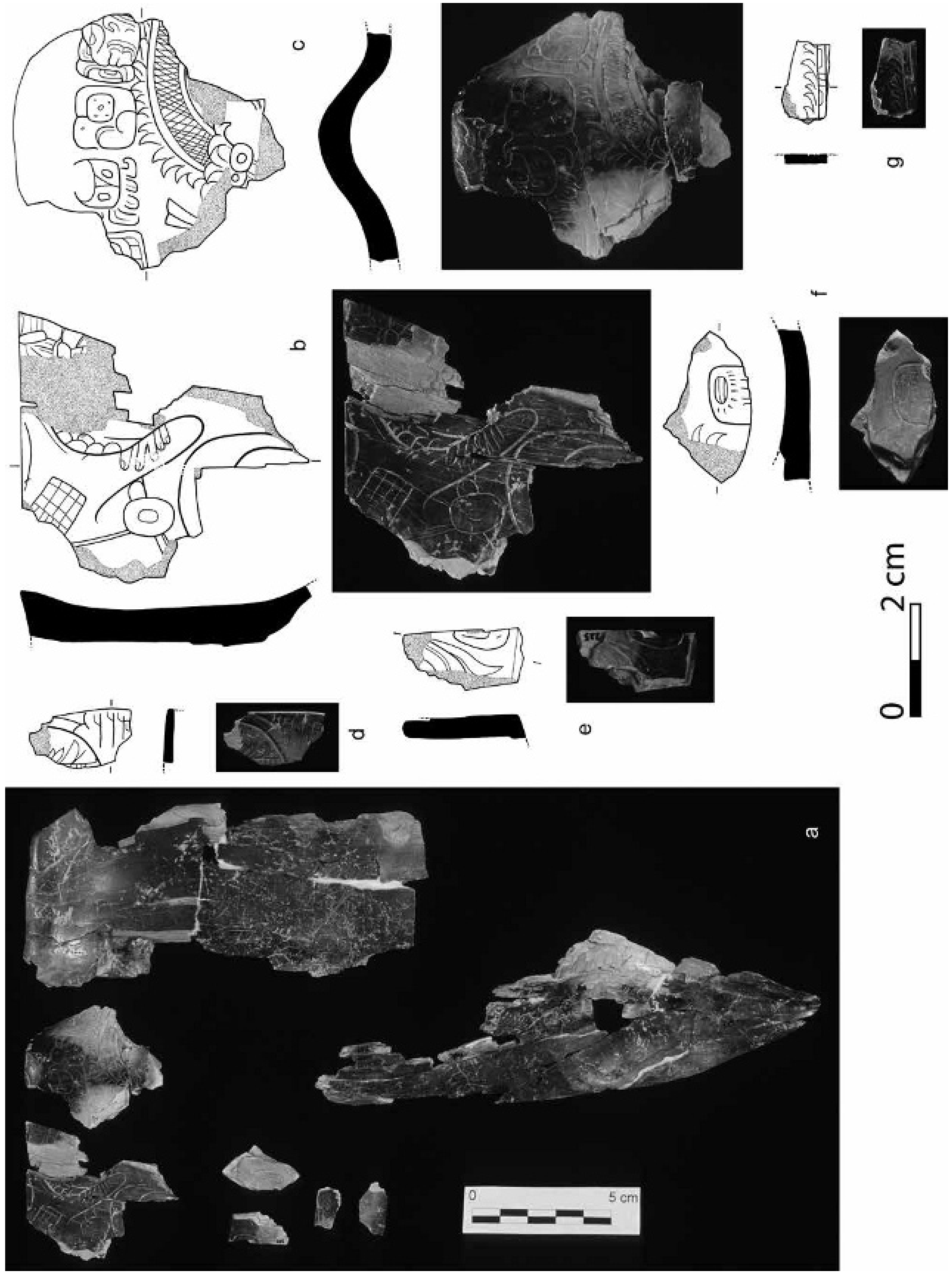


FIGURE 13.7. Carved helmet shell. 22A14-2-6, Cat. 647-10. (a) (1:2 scale) (b–g) Close-up of glyphs. (1/1 scale) (Drawings by Markus Eberl)

PART C

Synthesis and Conclusions

chapter

14

Synthesis of Data from the Rapidly Abandoned Buildings

Takeshi Inomata

INTERPRETATIONS OF THE RAPIDLY ABANDONED STRUCTURES

Although many of the objects excavated in and around the rapidly abandoned structures were probably in locations of storage rather than use, their distribution patterns provide important information about the association of rooms and areas with specific activities and individuals. As we examine their implications, we need to be aware that before abandonment Aguateca was in the unusual condition of being under the threat of military attack and that the resulting archaeological assemblages were affected by the eventual attack and destruction. Although I believe that the residents of Aguateca maintained their traditional way of life for a large part, the stress of living under threat and the construction of defensive walls probably forced them to make certain adjustments. I should also add that no households are static even in peacetime. Their members change, and they constantly modify patterns of activity. The "frozen moment" of Maya life seen in the Aguateca data offers us unique information, but we should remember that it represents only static pictures of one moment in a dynamic process. The presence of highly valued, easily transportable objects, such as jade and shell ornaments, indicates that a substantial part of the original possessions of the residents were left behind in those buildings, but their distributions are not exactly the same as before the attack. Certain items were probably carried away by the fleeing residents or by invaders, and certain objects were moved in the chaos of the attack, not to mention the loss of most organic materials after abandonment. By carefully evaluating these factors, we can make the best use of the unique data set from Aguateca.

Tables 14.1 and 14.2, as well as Figures 14.1–14.34, show the distributions of objects that appear to have been in usable condition at the time of abandonment, and thus do not include apparently discarded materials. Many artifacts were point-plotted in the field. Some objects, however, were recovered through the screening of excavated soils. For those items, we estimated their locations within the area of the given lot. When many symbols overlapped substantially, I slightly moved some of them for the sake of clarity. In addition to the artifact data discussed in this volume, the soil chemistry analysis conducted by Richard Terry and his students (Inomata et al. 2001; Terry et al. 2004) provided important information.

Structure M8-4 (House of Mirrors): Operation 23A

The floor assemblage from Structure M8-4 indicates a broad range of activities, including food preparation and storage, highly skilled craft production and scribal activity, and textile production, which is consistent with the interpretation that this building was a residence of an elite household (Figures 14.1–14.9). There is a fairly clear division in the use of space between activities primarily associated with females in the north room and north addition (food preparation and storage; textile production) and those more closely tied to elite males in the center and south rooms (other kinds of craft production, scribal activities, and political meetings with other courtiers and visitors). The household minimally consisted of the head of the household (most likely an elite male who was a scribe-artist courtier) and a female (probably his wife). The structure may also have been used by children, apprentices, and servants, but the group that consistently ate and slept in this building was not much larger than a nuclear family. The head of household appears to have been a member of the royal lineage or a courtier of the highest rank, which is suggested by carved bones with the Aguateca Emblem Glyph (a royal title) (see Chapter 13), the building's proximity to the Palace Group, and the presence of numerous precious objects, including carved shells, greenstone ornaments, imported ceramics, alabaster vessels, and pyrite

TABLE 14.1. Distribution of Ceramic Vessels by Rooms and Areas.

			COOKING/STORAGE VESSELS					SERVING VESSELS					OTHER VESSELS			
STRUCTURE	ROOM	TOTAL	CAMBIO JARS	TINAJA JARS	OPEN SUBIN BOWLS	CLOSED SUBIN BOWLS	COMALES	PLATES	BOWLS	VASES	JARS	PITCHERS	MINIATURES	INCENSARIOS	LIDS	REUSED
M7-22	Easternmost	16	2	3	3	1		4	2	1						
M8-4	North addition	12	1	1		1		3	2	2			2			
	North room	39	4	8		4	1	4	9	4		1	4			
	Center room	9		1					3	2	1			2		
	South room	14	3	4	1				1	3		1	1			
	South side	10	2	3				4	1							
	Total	84	10	17	1	5	1	11	16	11	1	2	7	2	0	0
M8-8	North addition	14	5	1	1		1	1		2	1		2			
	North room	21	3	3	2	2		5	4				2			
	Center room	13	3	3	1			3	1	1	1					
	South room	6	1	2				2	1							
	South addition	6	3	1		1				1						
	South side	3	1	1		1										
	Behind	14	3	3				3		1			4			
	Total	77	19	14	4	4	1	14	6	5	2	0	8	0	0	0
M8-13	West room	12	3	4	2		1	2								
	Center room	32	3	8	3			8	2	4			1			3
	East room	4				1		2		1						
	Front yard	1			1											
	Behind	13		5	2			3	1	1		1				
	Total	62	6	17	8	1	1	15	3	6	0	1	1	0	0	3
M8-2 & M8-3	M8-2	21	3	7	2	1		3	2	2			1			
	M8-3	12	2	3	1	1	1	1	2		1					
	Total	33	5	10	3	2	1	4	4	2	1	0	1	0	0	0
M7-34	North side	12	2	5				1	2			2				
	North room	11	4	3	2				1					1		
	Center room	8	2	1	3				1					1		
	South room	14	7	3	2			1	1							
	South side	1						1								
	Front yard	14	2	4	1			4	1	1					1	
	Behind	1								1						
	M7-91	12	3	4		1		3	1							
	M7-92	12	2	3	1			4	2							
	Causeway	10	1	4	1			1	1				1		1	
	Total	95	23	27	10	1	0	15	10	2	0	2	1	2	2	0
Total		367	65	88	29	14	4	63	41	27	4	5	18	4	2	3

Note: The table lists the complete or reconstructible objects that appear to have been used or stored by the residents or users of each building and does not include artifacts that appear to have been refuse or ones found in middens or fill. For the easternmost room of Structure M7-22, only the objects found inside the room are included.

Table 14.2. Distribution of Artifacts by Rooms and Areas.

Structure	Room	Limestone metates	Other metates	Manos (excl. reused)	Doughnut stones	Figurines	Figurine molds	Large worked sherds	Drums	Spindle whorls	Perforated round sherds	Mortars/ palettes	Pestles
M7-22	Easternmost	1		5		4			3	3			
M8-4	North addition	3		2		11		4	1	1			
	North room	1	2	11	3	10	2		2	6		2	
	Center room			1					1	1		8	2
	South room			1		1				1		3	
	South side							11					
	Total	4	2	15	3	22	2	15	4	9	0	13	2
M8-8	North addition			1		1				2		1	
	North room	2	1	4	3	3				7	1		
	Center room		1		1	1							
	South room									1			
	South addition			3						2			
	South side	1		4		1				1			
	Behind	5	2	4	1					2	1		
	Total	8	4	16	5	6	0	0	0	15	2	1	0
M8-13	West room	2		2						1			
	Center room			2		4				2			
	East room			1	1	1		1					
	Front yard			2						1			
	Behind			2	1	2				1			
	Total	2	0	9	2	7	0	1	0	5	0	0	0
M8-2 & M8-3	M8-2	2		4	1	9				4	1		
	M8-3			3		5			1	5	1		
	Total	2	0	7	1	14	0	0	1	9	2	0	0
M7-34	North side							1	1	1			
	North room	2				1	2	1		1			
	Center room	1		4						1			
	South room	2		3					2	1			
	South side												
	Front yard	2		1	1	2			1	1	1		
	Behind					1							
	M7-91	3	1			1							
	M7-92	1				1			1	1			
	Causeway								2	2			
	Total	11	1	8	1	6	2	2	7	8	1	0	0
Total		28	7	60	12	59	4	18	15	49	5	14	2

Table 14.2. (cont'd.) Distribution of Artifacts by Rooms and Areas.

Structure	Room	Polished axes	Bark beater	Obsidian	Chert chipped stone	Alabaster	Green stone	Pyrite	Elongated/ pointed bone	Other bone artifacts	Shell
M7-22	Easternmost	3	1	57	72		11	126	4	12	15
M8-4	North addition	1		112	180		4		8	8	19
	North room	4		130	376		12	13	14	9	85
	Center room			74	186		3	4	9	9	52
	South room	2		89	302	12	5	311	3	7	37
	South side			10	74		1	23			1
	Total	7	0	415	1118	12	25	351	34	33	194
M8-8	North addition	11	1	51	32		2		1	1	7
	North room	8		54	74		44	6	14	5	35
	Center room	1		19	75					1	5
	South room	1		21	23				5	2	4
	South addition			6	10				1		5
	South side			59	34			1	3	2	12
	Behind	1	1	22	76		2		16	6	16
	Total	22	2	232	324	0	48	7	40	17	84
M8-13	West room			34	121		1	1	3	2	5
	Center room			16	70	1			5	1	2
	East room	1		10	27					2	
	Front yard			8	59			1		1	1
	Behind	1		56	194				2	6	9
	Total	2	0	124	471	1	1	2	10	12	17
M8-2 & M8-3	M8-2			135	282			1	5	4	20
	M8-3			74	148				1	2	8
	Total	0	0	209	430	0	0	1	6	6	28
M7-34	North side	1		5	11			3	2	4	7
	North room			290	39						2
	Center room			9	33					2	6
	South room			12	54		4		3	2	3
	South side			1	14						
	Front yard	1		21	78		1	1			5
	Behind			3	26						
	M7-91			9	43				1	0	4
	M7-92			11	26		1	2	1	1	2
	Causeway	2		18	48			1	0	1	1
	Total	4	0	379	372	0	6	7	7	10	30
Total		38	3	1416	2787	13	91	494	101	90	368

Note: The table lists the complete or reconstructible objects that appear to have been used or stored by the residents or users of each building and does not include artifacts that appear to have been refuse or ones found in middens or fill. Only obsidian and chert chipped stone include all recovered pieces (data from Volume 2). For the easternmost room of Structure M7-22, only the objects found inside the room are included.

mirrors. Artifacts left in this building, particularly those in the south room, appear to have been somewhat more disturbed at the time of abandonment than those in the other structures (Volume 1:Chapter 10).

The center room contained a smaller number of objects than the side rooms. This pattern is consistent with those in Structures M7-35 and M8-10, which were excavated during the Petexbatun Project. I have suggested that these patterns reflect the use of center rooms primarily for courtly activities by the male head of household, including scribal work and meetings with other elite members (Inomata and Stiver 1998; Inomata et al. 2002). Notable finds in the center room include a concentration in front of the front bench of seven stone palettes or mortars (five chert, one sandstone, one metamorphic rock), one elaborately made chert pestle, and 15 unworked river clams (Figures 11.6, 14.10, and 14.11; Volume 2:Figures 4.1b, 5.19–5.21). This assemblage is similar to the one found in the center room of Structure M8-10 and suggests the work of a scribe. I suspect that these stone artifacts were used for pigment preparation, although the analysis of five mortars by Beaubien (2001) at the Museum Conservation Institute, Smithsonian Institution, did not detect unambiguous residues of pigments. The number of hematite and other ores that may have been used as pigments is relatively small (Figure 14.5), and the scribe may have primarily used pigments derived from organic materials or ochre. The extremely smooth surfaces of the chert palettes and pestle appear to be more suited to the preparation of relatively soft organic materials or ochre than hard mineral ores. The close correlation of the distribution of unworked river clams to that of stone palettes in Structures M8-4 and M8-10 corroborates the interpretation that they were used as ink pots or palettes in scribal activities. Emery, however, notes that evidence of river clam artifact production is present in the north and center rooms, and some of the unworked clams may have been intended for later manufacturing (Chapter 9). The head of household may have conducted his scribal work on the front bench, where he could enjoy good light. Alternatively, while the head of household sat on the rear bench to preside over political meetings, a court scribe may have kept the record on the front bench. In some palace scenes depicted in ceramic paintings, scribes occupy the front areas while the lords or other individuals sit on the rear bench (K511, K717, K3413).

The quantity of ceramics found in the center room is relatively small, but a small bowl left in the niche under the front bench of this room survived as a complete piece (Volume 1:Figure 3.9). Two probable censors found in the rear room (Cat. 310276 and 310319, Volume 1:Figure 8.13a–c) may have been used in rituals conducted in this room. Two long bone artifacts carved with glyphic texts most likely belonged to the head of household (Cat. 23A1121-7 and 23A1121-1, Figure 13.6b and c). The quantity of lithic, bone, and shell artifacts in the center room is relatively small, although some evidence of bone, shell, and wood working is present, mainly in the front area (Emery and Aoyama 2007). Aoyama did not find any evidence of bone, shell, or stone working on lithic artifacts recovered from the rear room (Volume 2:80).

The south room provided abundant evidence of manufacturing activities, including the Jester God diadem made of alabaster (Figure 14.9). This room and the nearby areas also contained 334 mosaic pieces of pyrite mirrors, including those still attached to fragments of a stone mirror back and those that were in the process of reworking. Finished rectangular ornaments were found next to the Jester God ornament, but many pieces in the process of reworking were unearthed 30 to 70 cm apart from the carved alabaster (Figure 14.7). Mosaic mirror pieces that had not been reworked were also found mixed with the reworked objects and in the surrounding areas. Next to the Jester God ornament, excavators found four pieces of possible siltstone and one ceramic fragment that had similar shapes to those of the reworked pyrite objects. It is probable that the partial alabaster vessel found in this room was being recycled for these ornaments (Chapter 6). Found in the same area were small worked bones with one end rounded. Their unpolished ends were less severely burned, probably because these ends were embedded in perishable materials (Cat. 23A652-73 and 23A553-1, Figures 8.4f and g, 8.8s and t). The reworked pyrite pieces, siltstone objects, and worked bones were probably parts of complex composite ornaments, such as headdresses, which were meant to be used along with the Jester God headband. A resident of this structure and assistants appear to have been preparing new ceremonial attire or refurbishing existing attire for the ruler. Alternatively, the diadem and other attire may have been intended for the elite courtier of this household. The level of iron in the floor of the south room, however, was relatively low, nor did we find debitage from the reworking of pyrite pieces. Interestingly, soil chemistry analysis detected an area of high iron concentration 2 m to the southeast of the structure (Terry et al. 2004). If the manufacturer cut and polished pyrite pieces in the south room, he must have thoroughly collected manufacturing refuse

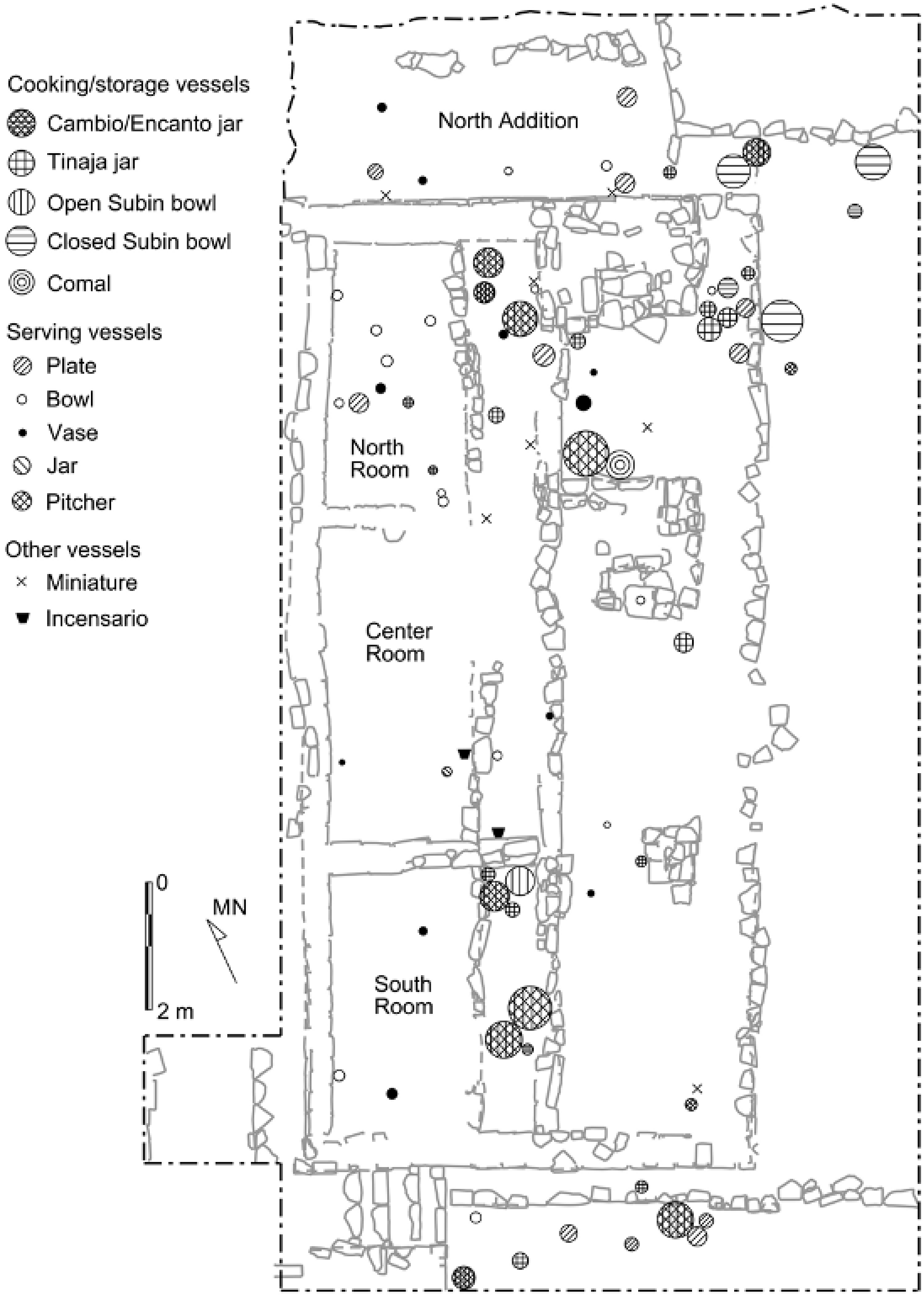


Figure 14.1. Distribution of ceramic vessels in Structure M8-4.

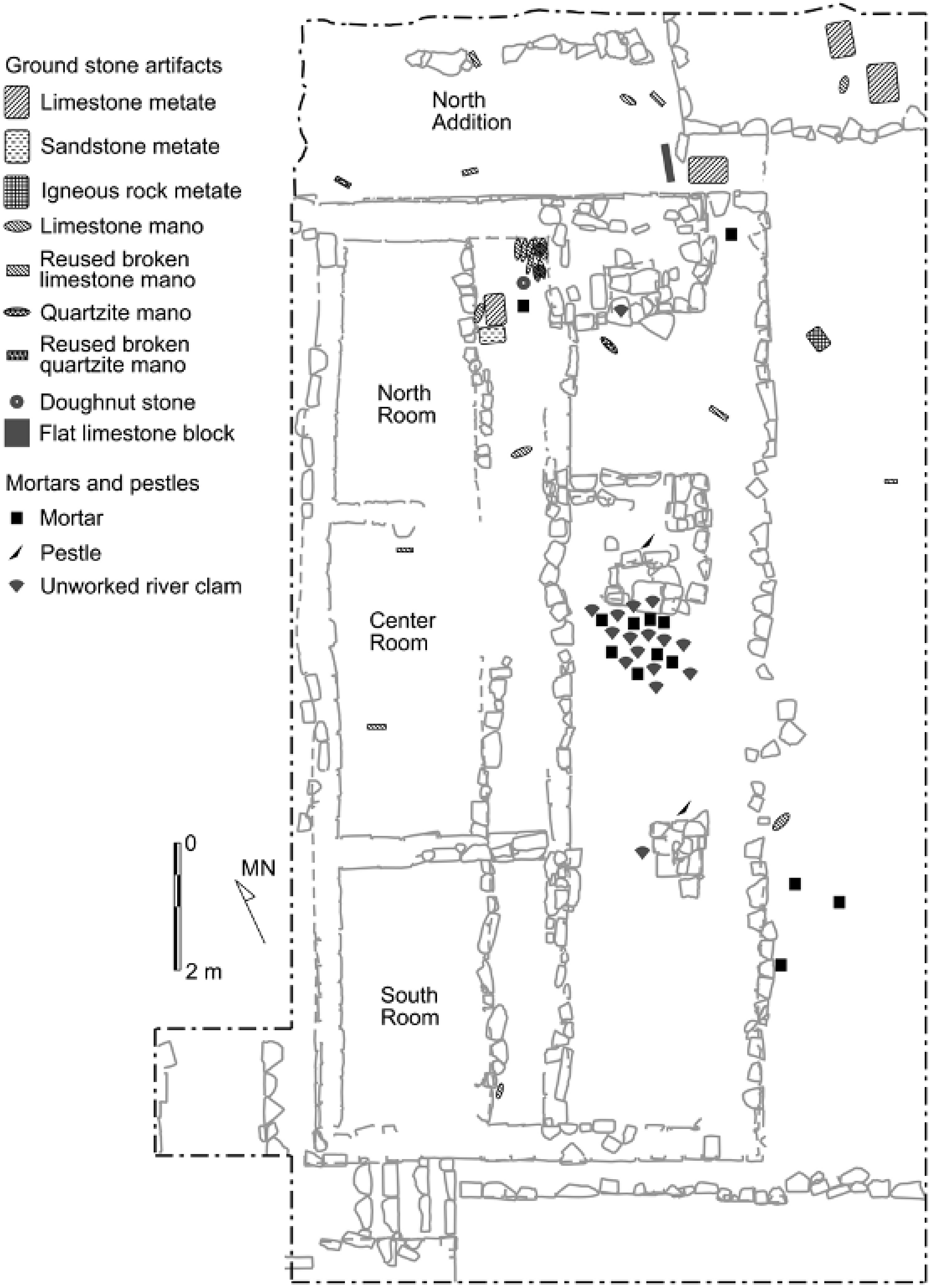


FIGURE 14.2. Distribution of grinding stone artifacts, mortars, and pestles in Structure M8-4.

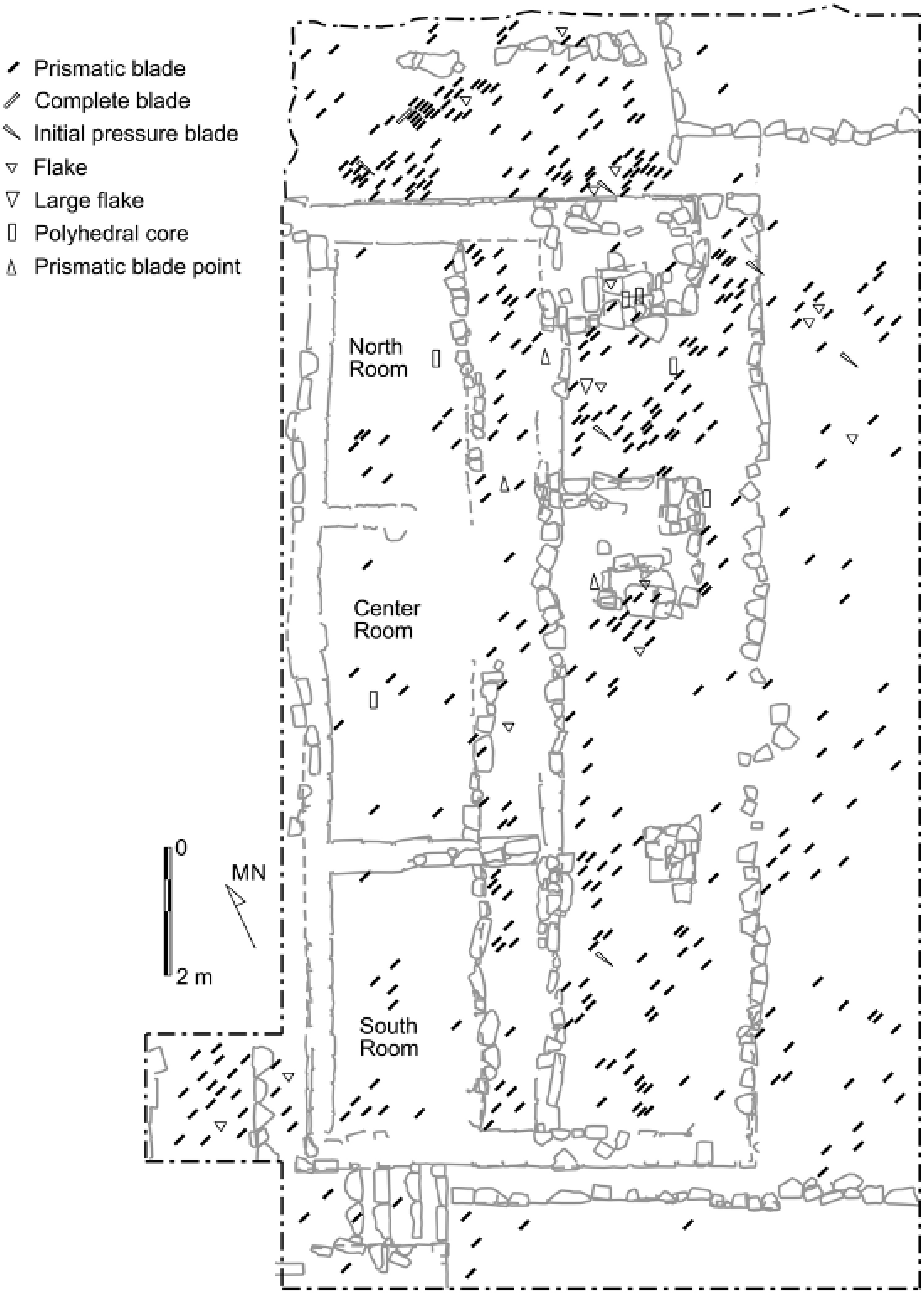


Figure 14.3. Distribution of obsidian artifacts in Structure M8-4.

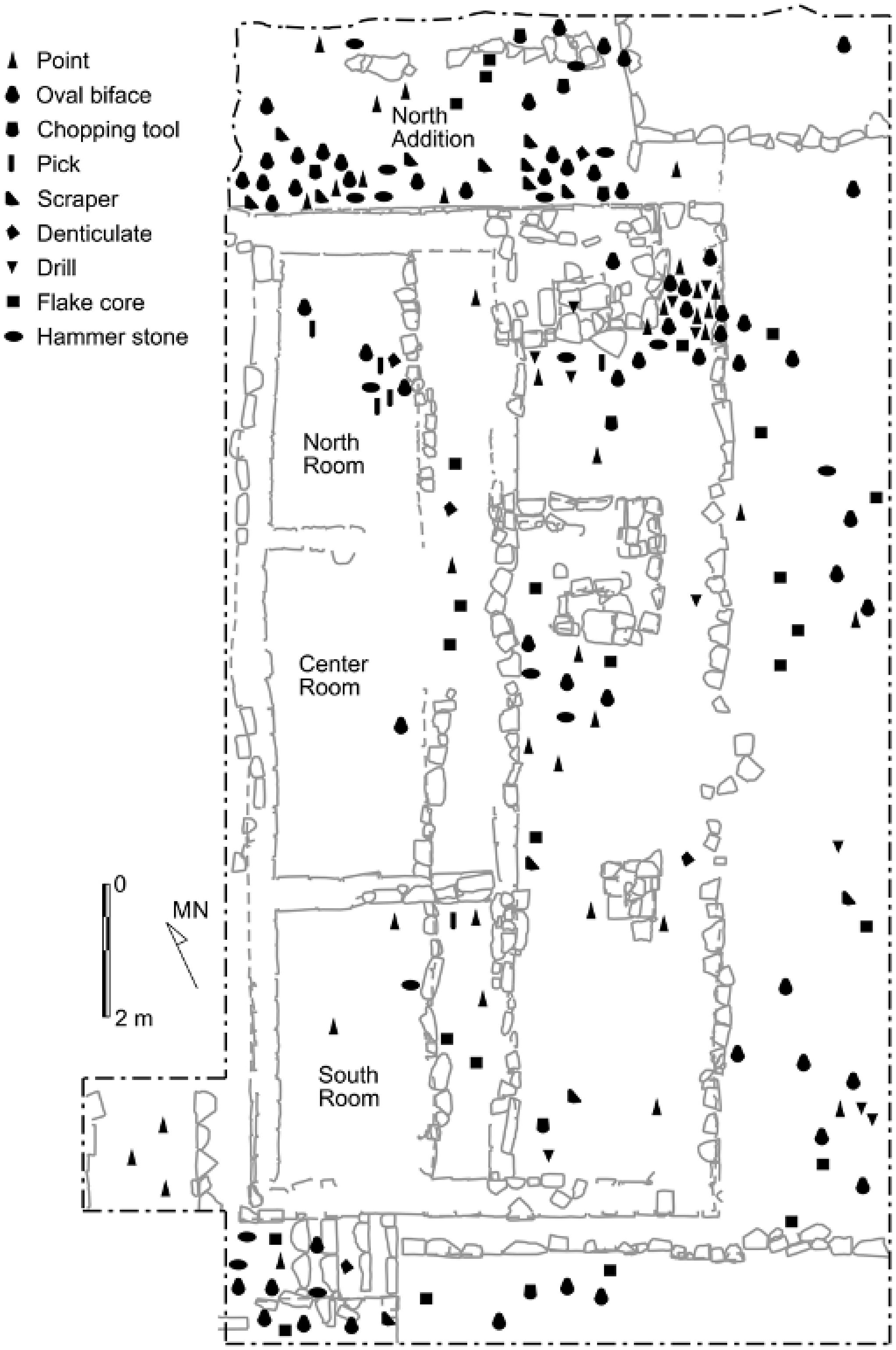


Figure 14.4. Distribution of chipped stone tools and related artifacts in Structure M8-4.

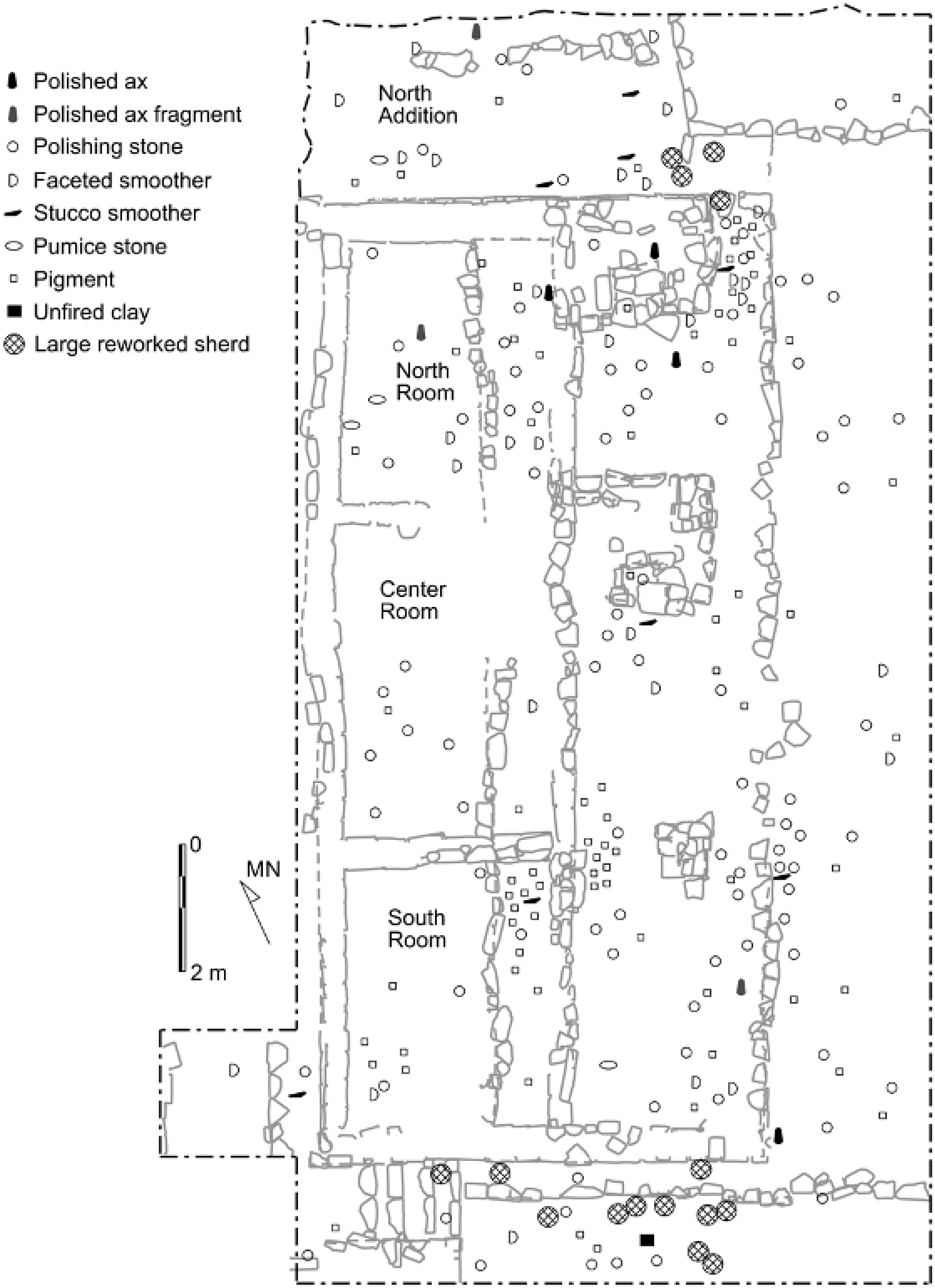


FIGURE 14.5. Distribution of polished axes, polishing stones, pigments, unfired clay, and large reworked sherds in Structure M8-4.

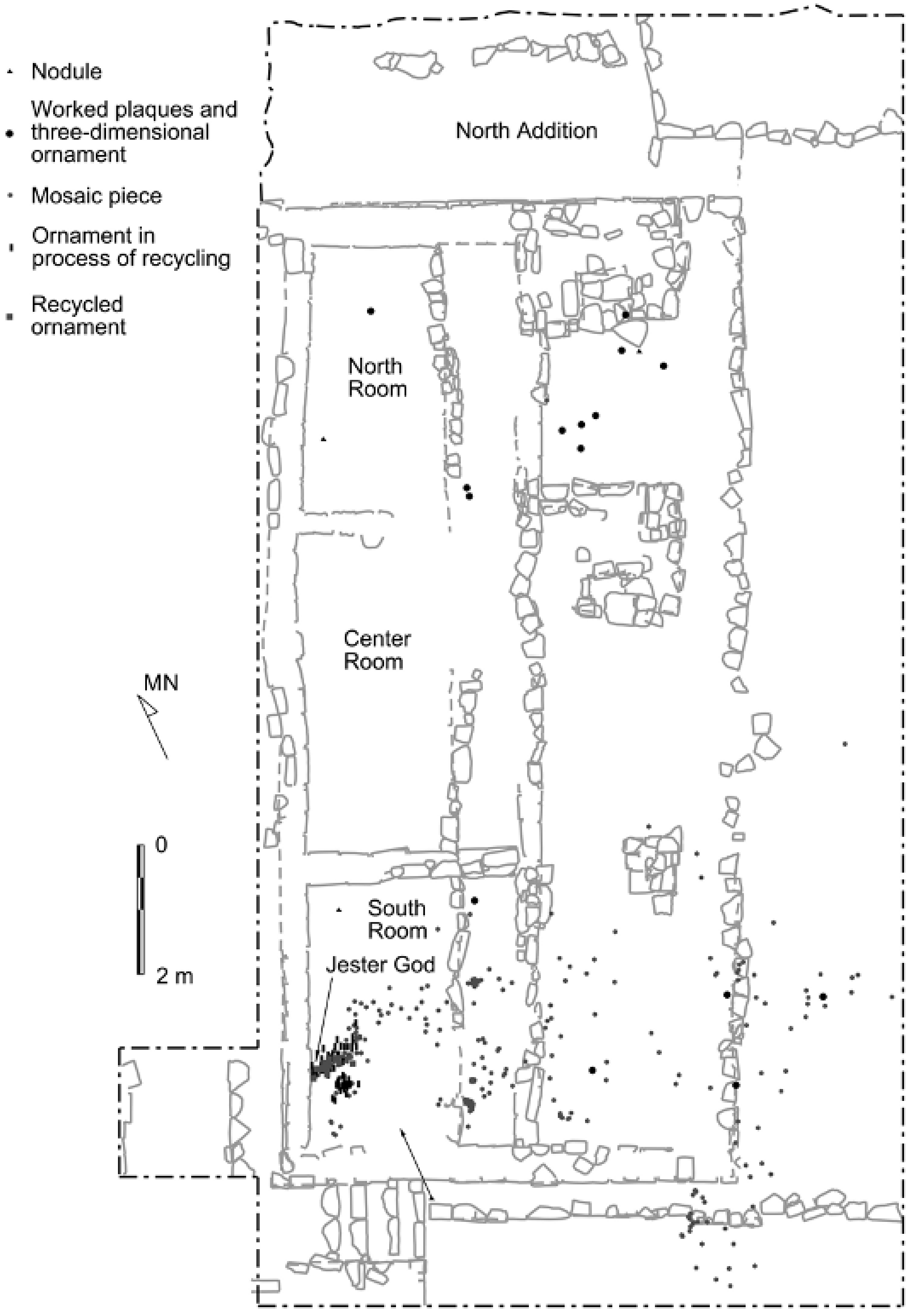


FIGURE 14.6. Distribution of pyrite artifacts in Structure M8-4.

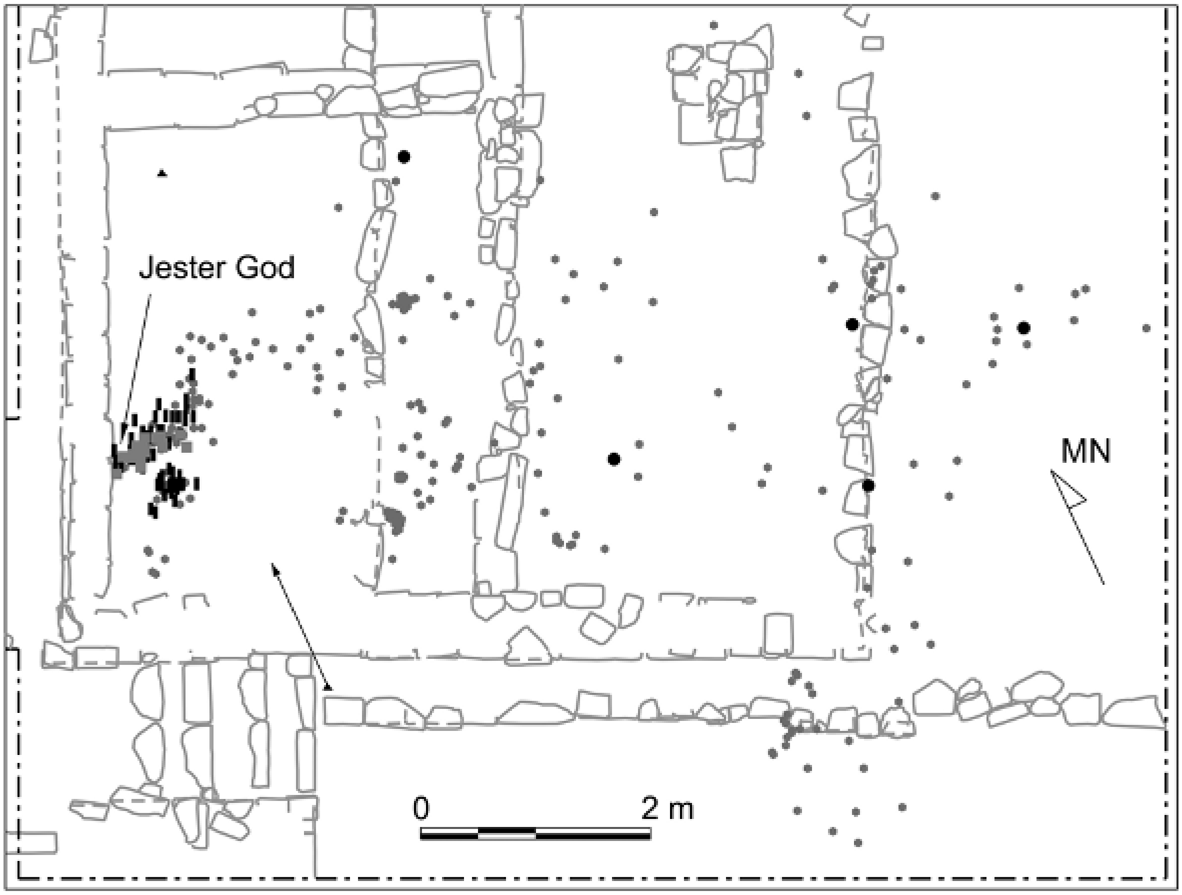


FIGURE 14.7. Distribution of pyrite artifacts in the south room of Structure M8-4.

and thrown it outside. Or he may have worked outdoors and brought back unfinished pieces to the south room.

There was also substantial evidence of shell and bone working in the south room. Aoyama found the highest percentage of shell or bone use-wear in the entire site on lithic artifacts from the rear part of the south room (Volume 2:80), and Emery identified remains of bone and shell manufacture in this room (Emery and Aoyama 2007; Chapter 9). Some of the bone and shell artifacts produced in and around the south room may have been used with the Jester God diadem and other ceremonial gear. Emery also found bone and shell debitage in the area south of the building, which suggests behavior similar to that of pyrite working; the artist may have worked mainly outside the room while he or she stored tools and materials inside, or the artist may have discarded debitage outside. Numerous shell artifacts found in the south room most likely include finished ornaments that were used by the residents. But I should note that the quantity of greenstone ornaments in this room was small compared with that in the north room. Three stone palettes found in the front area of the south room may have been originally used and stored near the front pillar between the center and south rooms, along with the pestle and an unworked river clam (Figure 14.2). Like the front bench of the center room, the front area near the pillar might have been used for scribal and artistic work. There were 14 ceramic vessels in this room, including three storage jars and various serving vessels. These vessels may be related to food consumption, as suggested by the presence of avocado and guava remains as well, but some were probably used for manufacturing activities.

The area south of the structure was probably used for manufacturing activities and for the storage of related tools. In addition to the evidence of bone, shell, and pyrite working discussed above, excavators unearthed one chunk of unfired clay and eleven large reworked sherds, some with clay attached to them (Figures 3.6–3.8). Four more similar sherds were found in the north addition, making a total of fifteen in this structure. Given the presence of two figurine molds in the north room of this building, these reworked sherds may have been used for the production of figurines. Only three similar reworked sherds were found

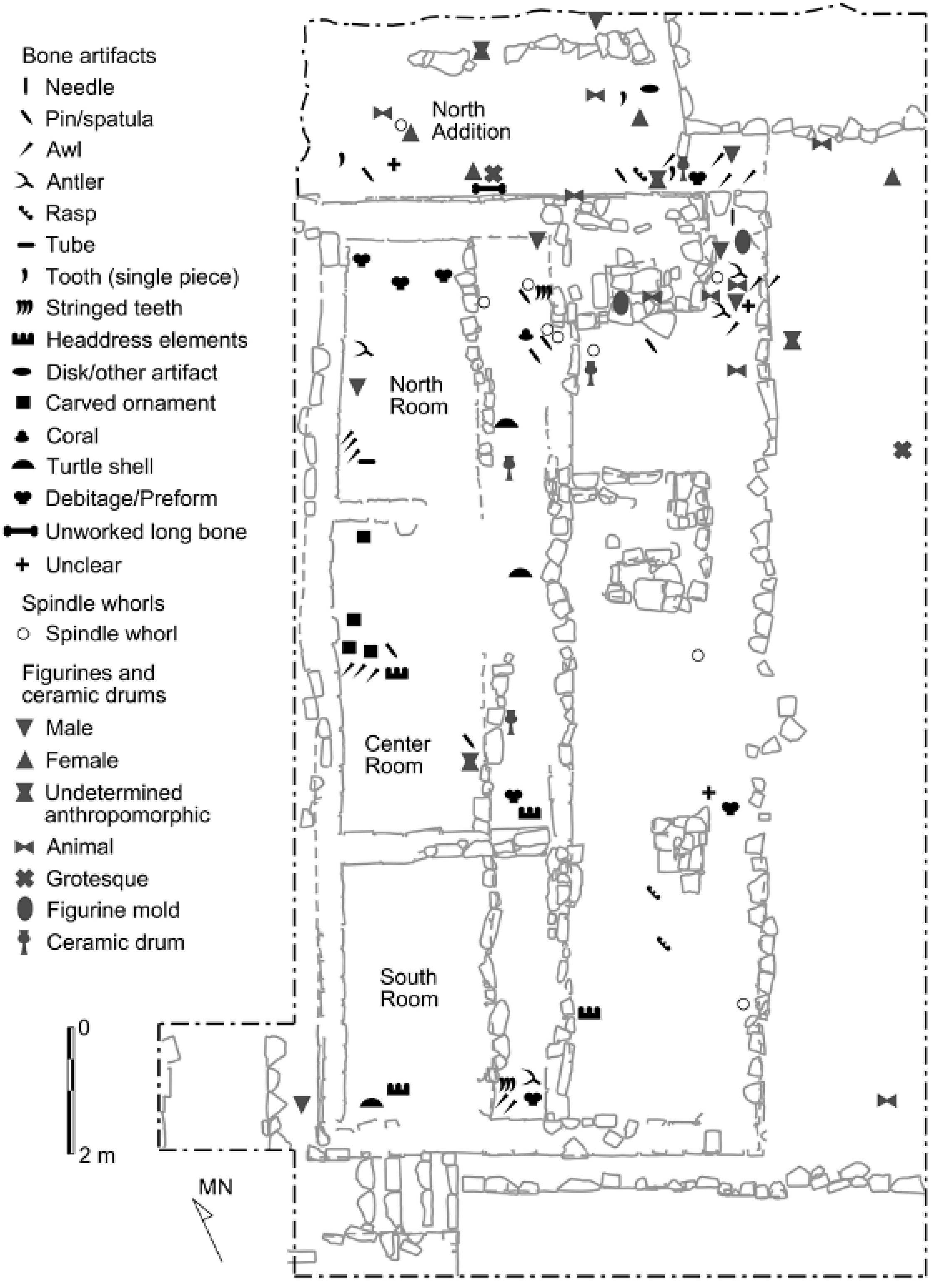


FIGURE 14.8. Distribution of bone artifacts, spindle whorls, figurines, and ceramic drums in Structure M8-4.

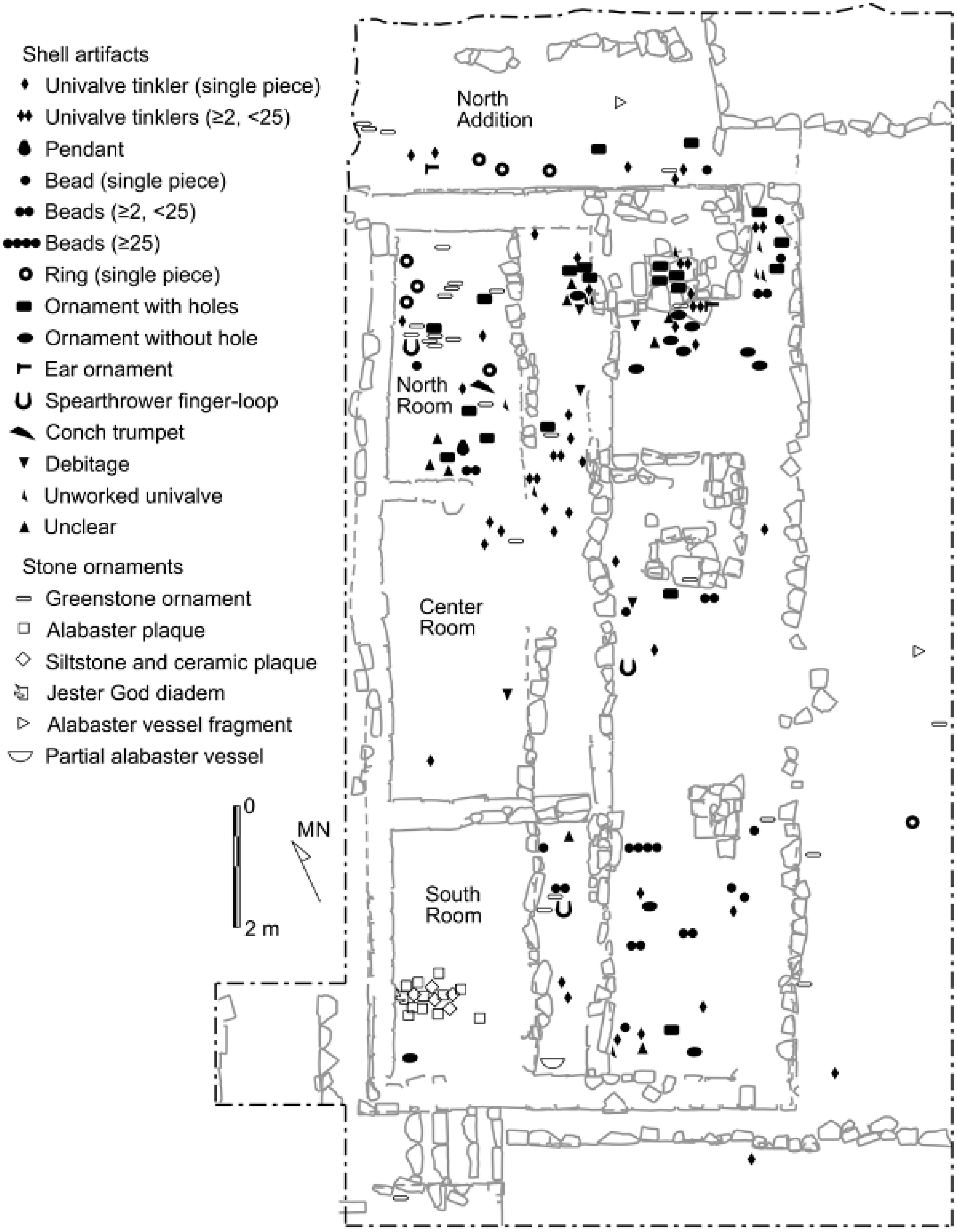


FIGURE 14.9. Distribution of shell artifacts and stone ornaments in Structure M8-4.

in the rest of the excavated structures in the Causeway area (Figure 3.5), and Structure M7-34, where two of them were found, also contained two figurine molds.

The north room contained numerous lithic tools and several utilitarian vessels, including large storage jars. Found on the northern side of the front porch of this room was a large metate, most likely used for grinding maize. Nine manos and three doughnut stones were neatly stored on the floor in front of the rear bench (Volume 1: Figure 3.10). These finds suggest that the north room and the nearby space were associated with food storage and preparation. Lentz found remains of maize, squash, beans, annona, and chile pepper in this room (Chapter 10). The high level of phosphate concentrations found on the bench of this room and in the adjacent north addition support this interpretation (Terry et al. 2004). In addition, the north room contained six spindle whorls, and some of the numerous bone awls and pins may also have been used for textile production. Food preparation and textile production are believed to be carried out primarily by females, and thus the north room appears to have been used mainly by females. The high concentration of figurines in this room may indicate that the figurines were used primarily by females and children (Triadan 2007). The remarkable large figurine representing a male courtier (Cat. 23A264-1, Figure 2.6, Volume 1:Figure 3.12) found in the front area of this room, however, may have been more closely tied to the elite identity of the entire family or of the male household head.

It is not clear whether a male or a female used the faceted smoother for stucco or other materials which was found in the front area and had red stains on the flat facet (Figure 14.12, Volume 2:Figure 4.2b). In particular, the four polished axes found in this room may have been associated more closely with male activities, as seen in Structure M8-8 (see below), although we also need to consider the possibility that females used these tools as well. In addition, the room contained probable musical instruments, including ceramic drums, a ceramic flute, and a turtle carapace, which are usually played by males in ceramic and mural paintings. It appears that an important function of the north room was the storage of numerous items used by various household members, including a large number of shell and greenstone ornaments. The north room and the nearby areas were also spaces for bone and shell working. Aoyama notes that lithic artifacts from this room show use-wear of wood, bone, and shell working (Volume 2:82), and Emery identified remains of shell and bone working (Emery and Aoyama 2007; Chapter 9). The presence of two figurine molds in this room (Figure 2.1b, d) suggests that a resident (possibly female) made figurines either around this room or in the north addition and on the southern side of the buildings where large worked sherds were found. Unlike the palettes from the center and south rooms, which were clearly recognized as scribal implements in the field, the two possible mortars from the north room shown in Figure 14.2 were identified by Aoyama during the lab season (Volume 2:Table 5.10, Figure 5.22). The nature of those objects from the north room is not clear.

The north addition contained a relatively small number of ceramic vessels, but the quantity of lithic tools was fairly high, indicating that it was mainly a working area. The activities carried out in this area may have included food preparation, as indicated by the high soil phosphate levels (Terry et al. 2004) and the presence of cacao seeds (Chapter 10). The production of figurines may also have taken place in this area, as suggested by four large reworked sherds with clay residues.

In sum, the use of space in Structure M8-4 is fairly consistent with that of the other elite residences. There was a relatively clear division of gendered spaces, although their use was by no means exclusive. The male head of household was most likely a courtier of the highest rank, who probably presided over political meetings in the center room and was also responsible for scribal work and the production or maintenance of ceremonial attire.

Structure M8-8 (House of Axes): Operation 20A

Structure M8-8 was probably an elite residence, and its use of space was likely similar to that of Structure M8-4 (Figures 14.13–14.19). The center room appears to have been used for receptions and food consumption, primarily by the male head of household. The north room probably served for food preparation and storage and also contained tools for textile production, which was closely associated with females. The north addition was a working and storage area. A potential difference from Structure M8-4 is seen in the use of the south room. The quantity of artifacts in this room was small, and it may have been used mainly by the household members as a living and sleeping area. The south addition located next to it may have served storage functions related to domestic activities. The excavation of the area behind the structure showed that it was an

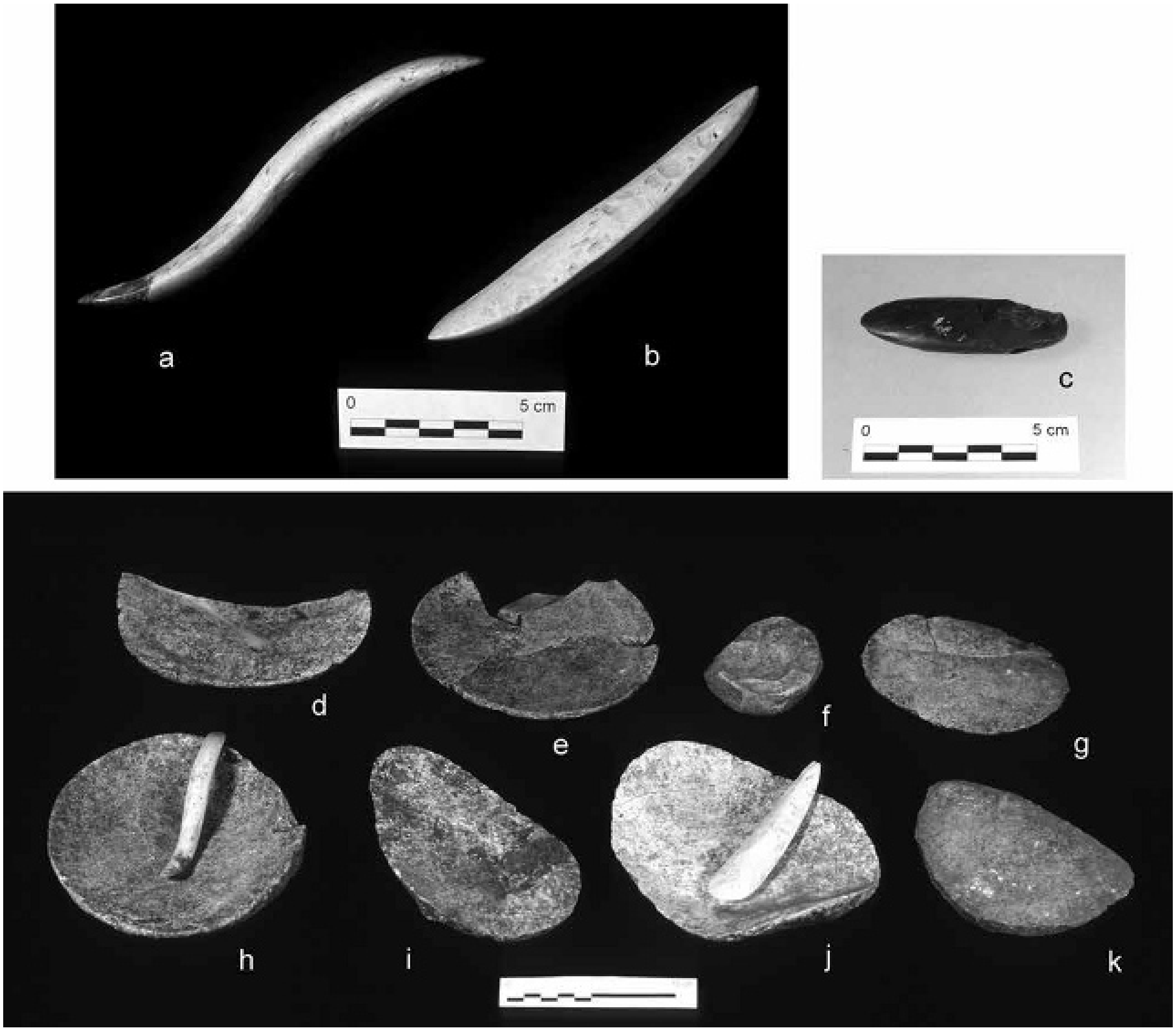


FIGURE 14.10. Chert stone pestles and palettes found in Structure M8-4. (a–b) Pestles. (½ scale) (a) 23A48-2-1, Cat. 874-1. (b) 23A12-3-1, Cat. 572-1. (c) Polisher or pestle. 23A42-3-2, Cat. 2000-1. (½ scale) (d–k) Palettes. (¼ scale) (d) 23A25-3-3, Cat. 355-1. (e) 23A12-3-4, Cat. 607-1. (f) 23A15-3-2, Cat. 1455-1. (g) 23A48-3-4, Cat. 1470-1. (h) 23A29-3-2, Cat. 808-1. (i) 23A48-3-4, Cat. 1469-1. (j) 23A15-3-2, Cat. 1502-1. (k) 23A48-3-4, Cat. 2035-1.

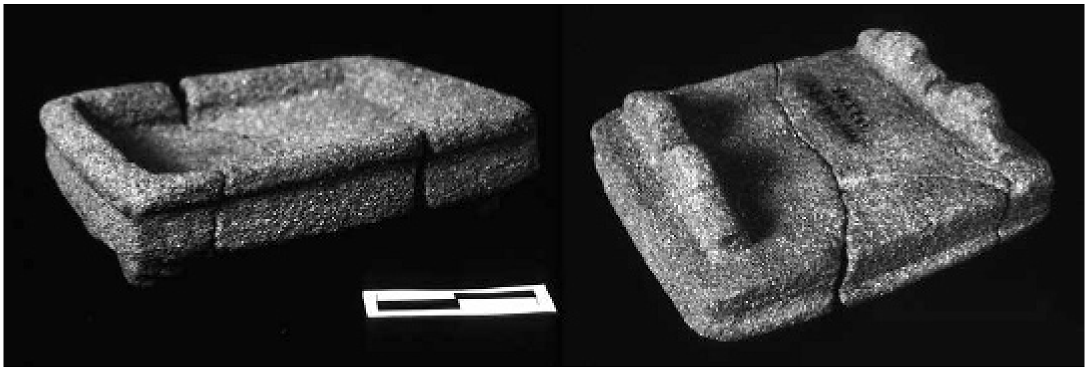


FIGURE 14.11. Sandstone mortar found in the center room of Structure M8-4. 23A15-3-1, Cat. 1459-1. (1/1 scale)

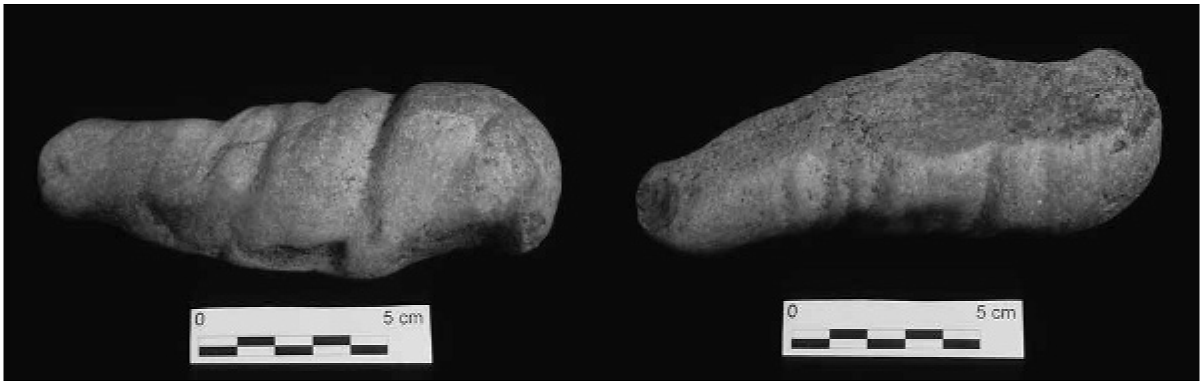


FIGURE 14.12. Chert faceted smoother found in the north room of Structure M8-4. 23A44-3-1, Cat. 1658-1. (½ scale)

important activity area tied to food preparation and storage, as well as to textile production. Like that of Structure M8-4, the head of this household was most likely a highly ranked courtier who was also an artist. However, the specific type of artistic production he carried out was different from that in Structure M8-4. Structure M8-8 did not contain polished stone palettes and pestles, and evidence for the production of ceremonial attire, including that of bone and shell working, was limited. Instead, there were abundant indications of probable hide or bark processing. Particularly notable finds include 22 polished axes, many of which were probably used for the carving of stone monuments.

Thirteen ceramic vessels, including a large storage vessel, were associated with the center room. The southern part of the bench was not excavated because of a large tree standing there, so the total number of vessels may be even larger. The room also contained lithic tools in a number similar to those of the other rooms. In particular, the high concentration of polishing stones and faceted smoothers on the bench is notable. This pattern is somewhat different from that of the center rooms of Structures M8-4, M7-35, and M8-10 (Inomata and Stiver 1998). It is not clear whether this difference reflects distinctions between the organization of activities in households oriented toward scribal work (Structures M8-4 and M8-10) and the one focusing on stone carving, or whether it resulted from different reactions to an anticipated enemy attack. Lentz identified numerous seeds of wild tamarind in this room (Chapter 10). We may wonder whether the occupant of the room used them for divination, along with round pebbles. The excavators of Cerén Structure 12 found two piles of beans and suggest that they may have been used for divination in a manner comparable to the divinatory use of beans, maize kernels, and quartz crystals in ethnographic examples (Simmons and Sheets 2002; see Douglas 1967: 139; Vogt 1969; Wagley 1949:71).

Despite these differences, this chamber of Structure M8-8 exhibited general characteristics associated with the common function of the center room, that is, use primarily by the male head of household for formal meetings with other courtiers. The ceramic vessel assemblage is geared toward the serving of food and storage functions rather than food preparation. Feasting must have been an integral part of courtly meetings, as suggested by numerous ceramic paintings, and the male courtier and other household members may have consumed food in this room on various occasions. Three nearly complete obsidian blades found on the bench may have been for bloodletting rituals, as Aoyama suggests (Volume 2:92); they are similar to the complete obsidian blades excavated from the center room of Structure M8-10 and a bone imitation of a stingray spine found in the center room of Structure M7-35 (Inomata and Stiver 1998). The presence of copal wood identified by Lentz (Chapter 10) also points to the room's association with ritual activity. Types of artifacts strongly associated with females (spindle whorls, bone tools for textile production, and figurines) were completely absent or extremely limited in this room.

The number of artifacts in the south room was relatively small, and this room might have been a sleeping and resting space. A relatively small number of bone artifacts, including awls and pins, may have been used by females for textile production. The small south addition was not equipped with a bench, and it may have been used primarily for storage, as suggested by the presence of large ceramic jars and three manos. The low soil phosphate level (Terry et al. 2004), as well as the identification of maize, squash, and nance pits in this room (Chapter 10), also corroborates this interpretation.

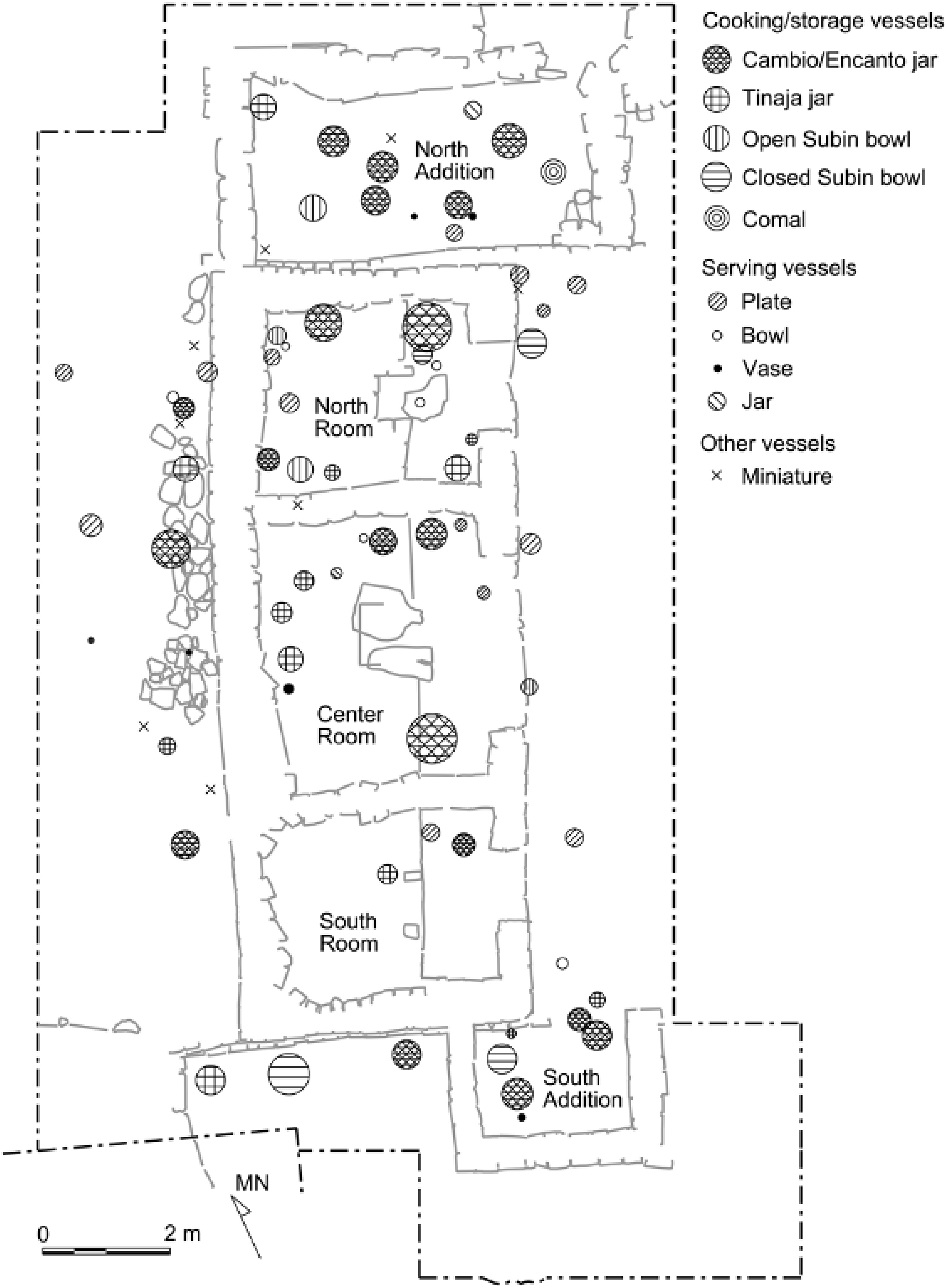


Figure 14.13. Distribution of ceramic vessels in Structure M8-8.

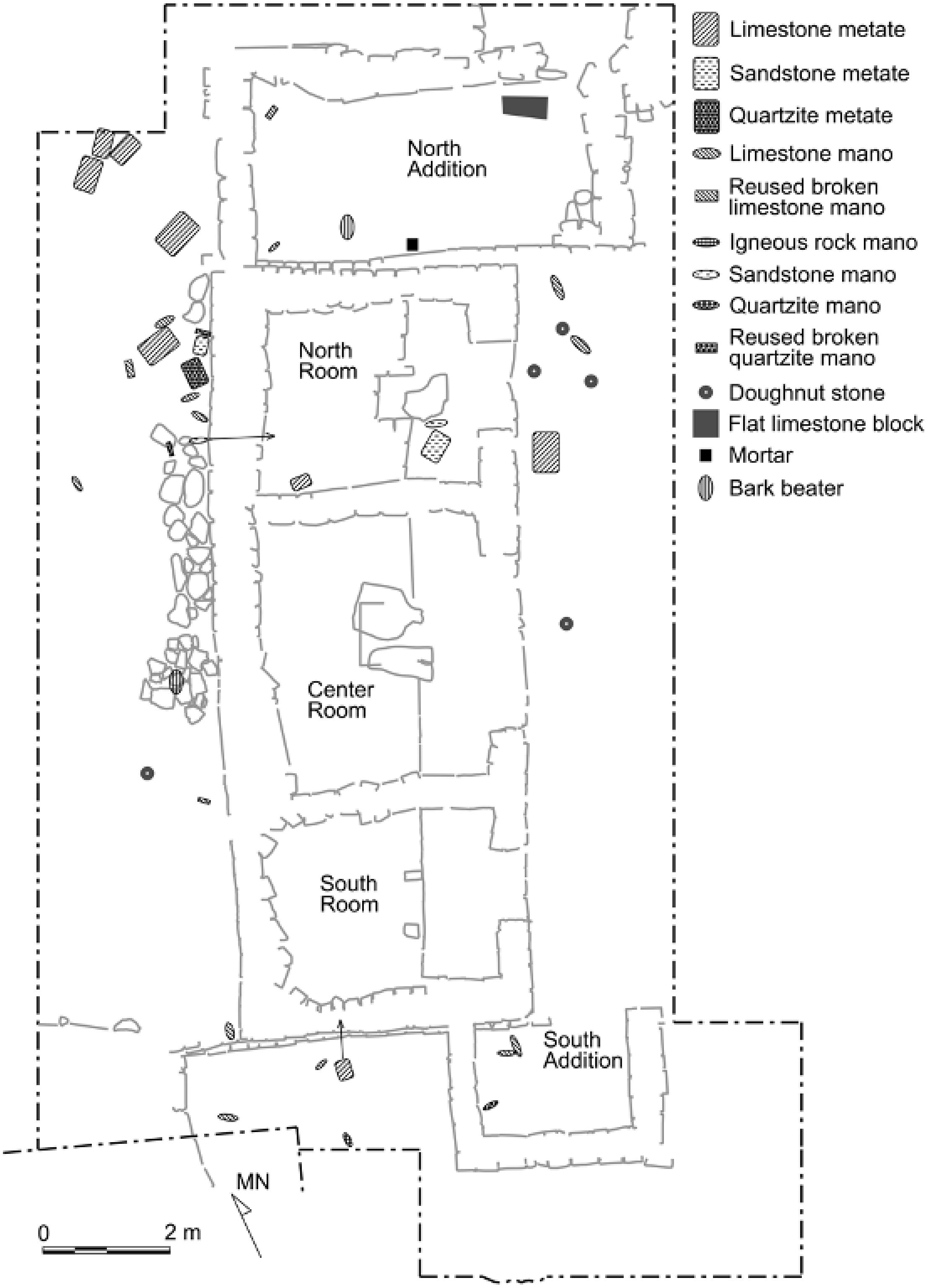


FIGURE 14.14. Distribution of grinding stone artifacts, mortars, and bark beaters in Structure M8-8.

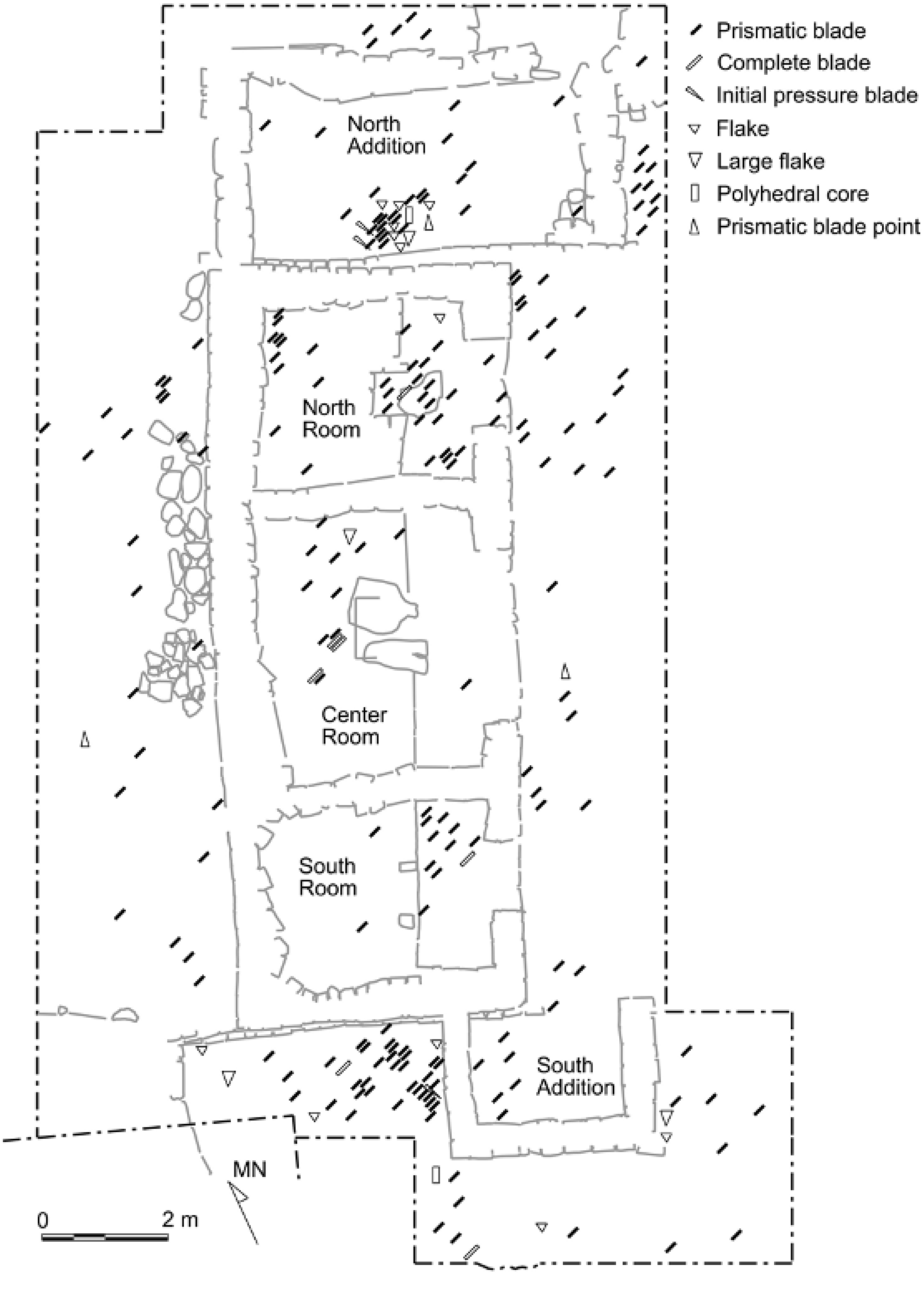


FIGURE 14.15. Distribution of obsidian artifacts in Structure M8-8.

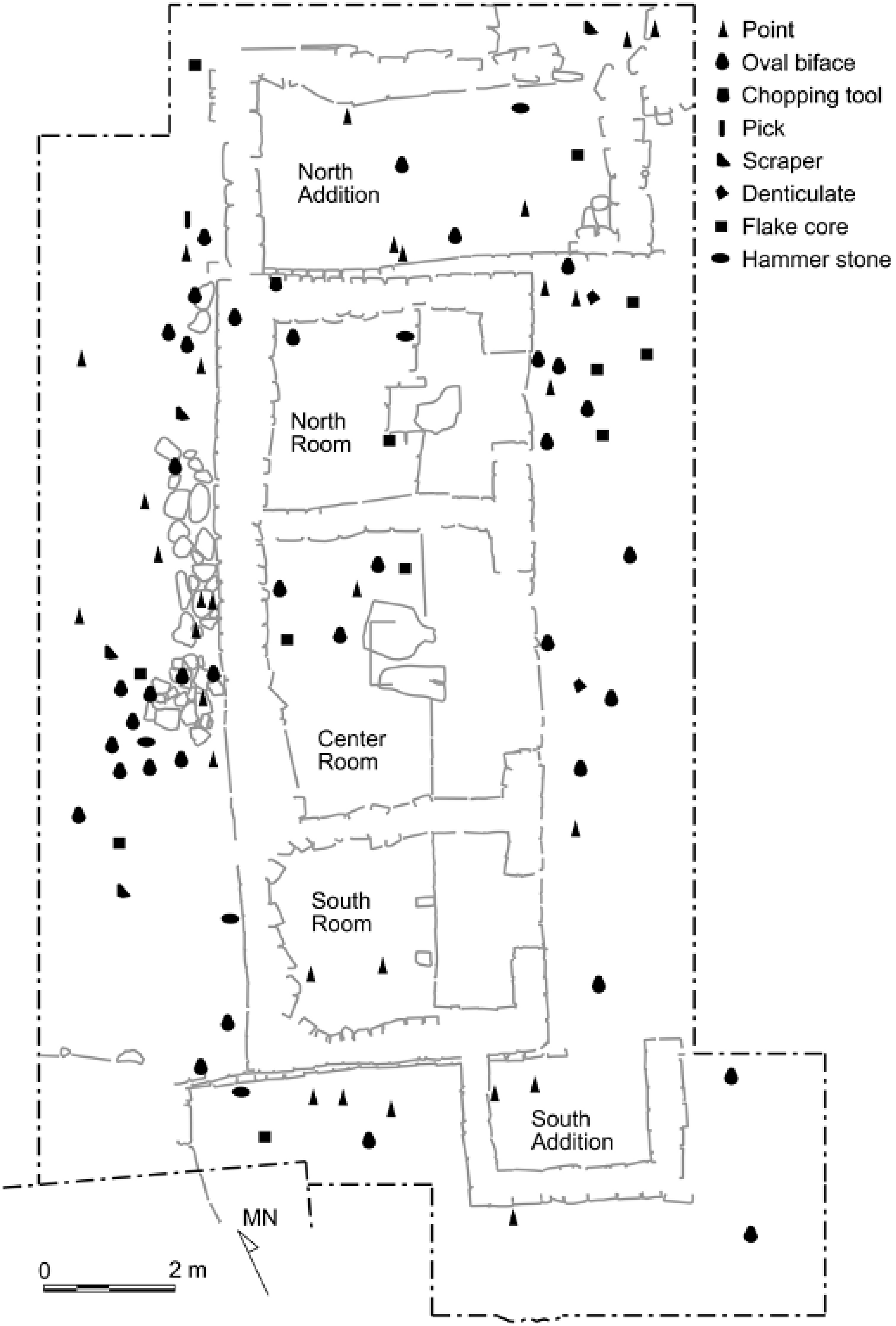


Figure 14.16. Distribution of chipped stone tools and related artifacts in Structure M8-8.

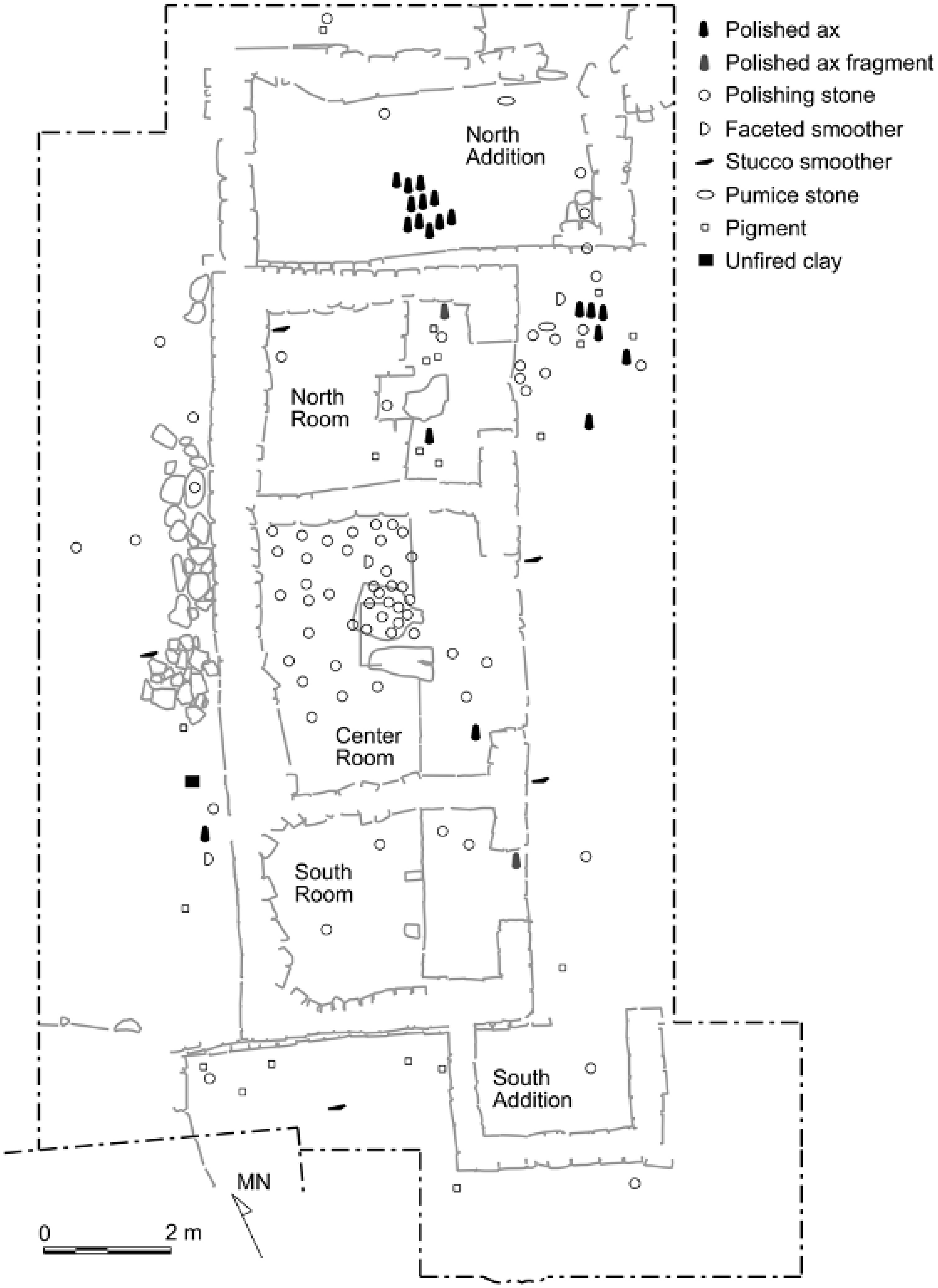


FIGURE 14.17. Distribution of polished axes, polishing stones, pigments, and unfired clay in Structure M8-8.

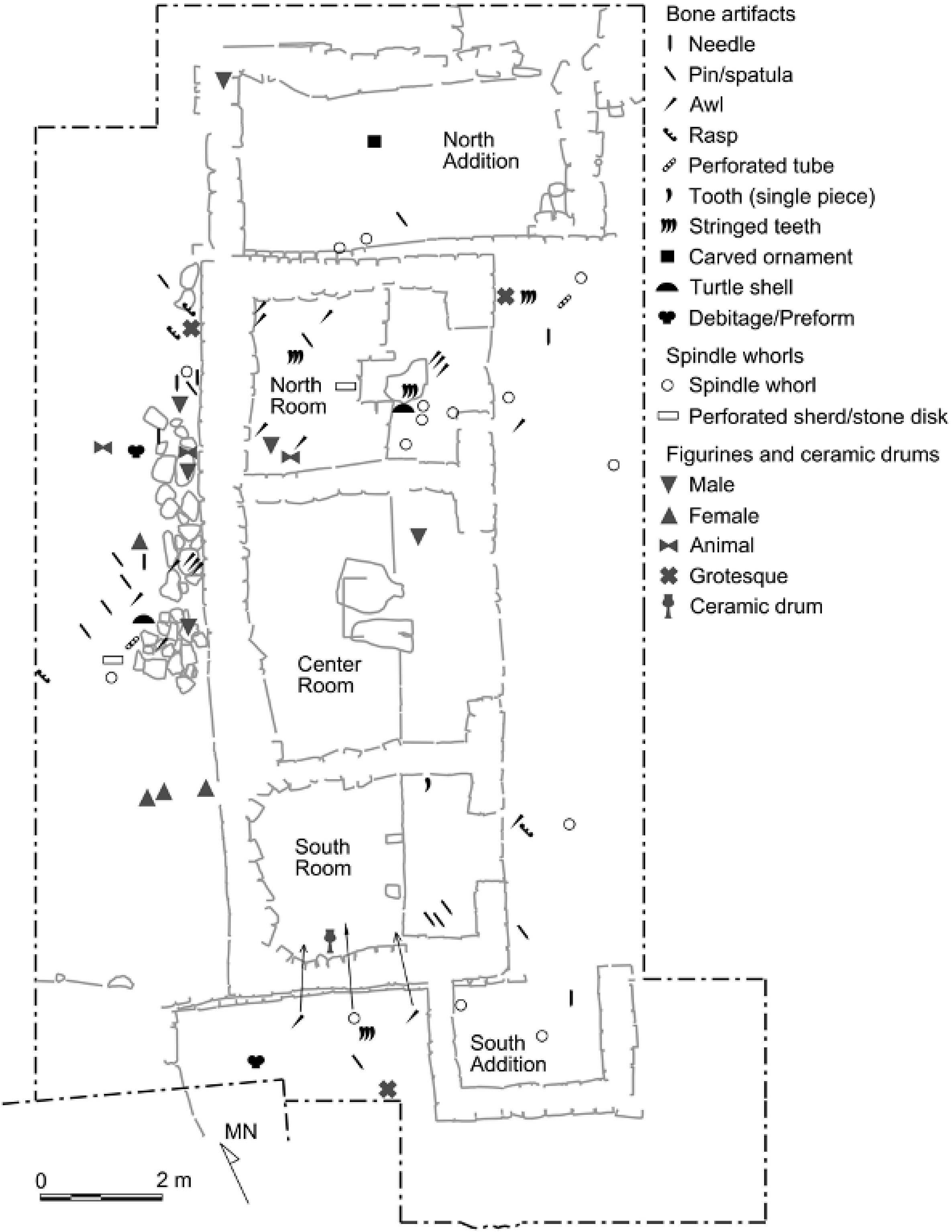


FIGURE 14.18. Distribution of bone artifacts, spindle whorls, figurines, and ceramic drums in Structure M8-8.

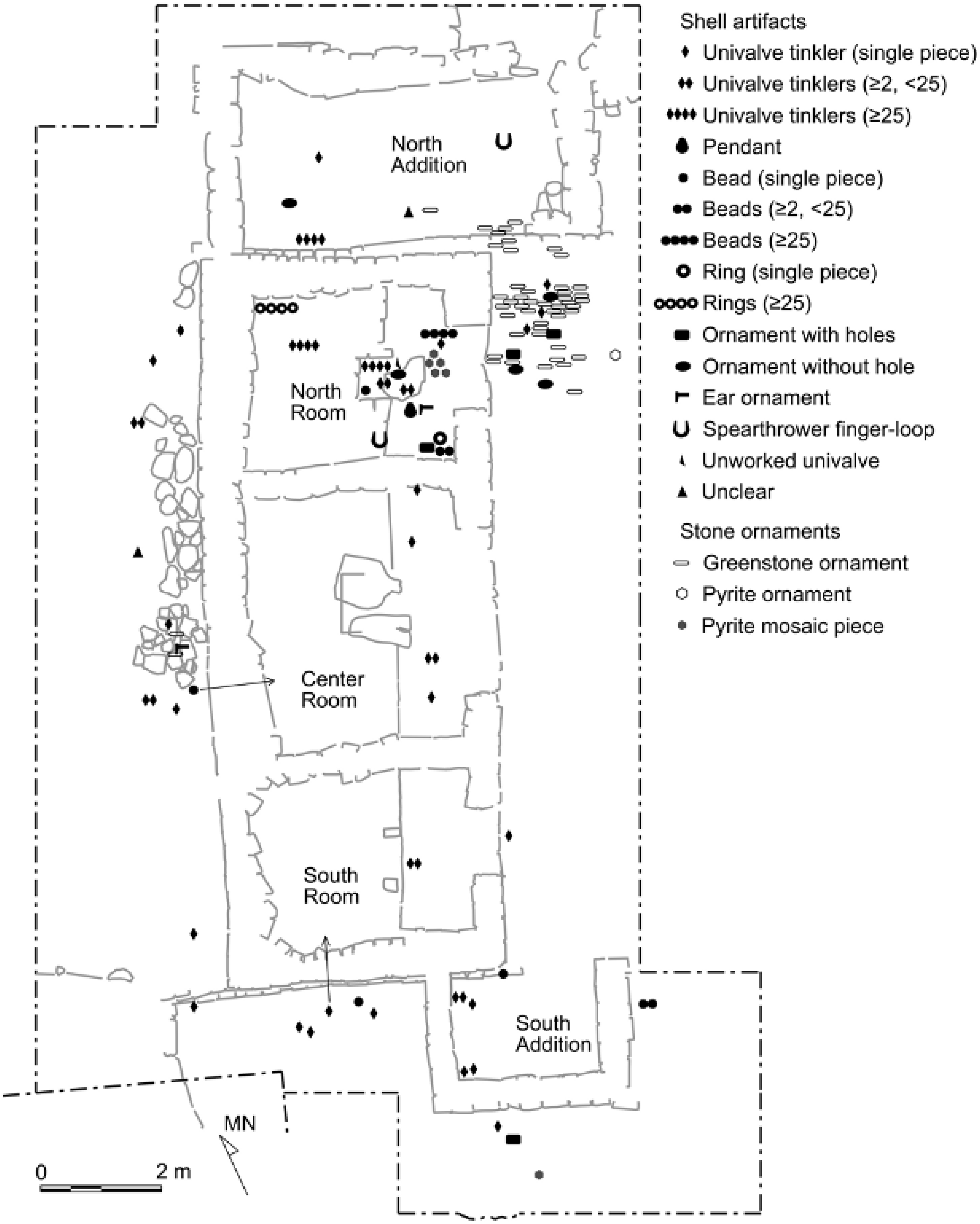


FIGURE 14.19. Distribution of shell artifacts and stone ornaments in Structure M8-8.

The use of the north room appears to have been similar to that of Structure M8-4. The presence of numerous ceramic vessels and grinding stones, as well as possible remains of calabash bowls (Chapter 10), indicates that the room was used for food preparation and storage. This interpretation is consistent with the presence of maize and squash remains (Chapter 10). The large limestone metate placed in front of this room may have been the primary maize-processing tool for this household, although the paired sandstone metate and mano were probably used for materials other than food (Volume 1:Figure 3.23). As in Structure M8-4, this room appears to have been primarily a female space. The highest concentration of spindle whorls in this building was found here, and a substantial portion of bone awls, pins, and needles recovered in this room were probably used by females for textile production. The room may also have had general storage functions. A high number of shell and greenstone ornaments, found in this room and in the area in front of it, were probably used by both male and female members of the household. The eight polished axes, along with those found in the northern addition, were most likely used by the male carver.

The north addition, without a bench, was most likely a work area with related storage functions. The area appears to have been associated mainly with males. The most notable find in this room is a concentration of eleven polished greenstone axes of various sizes (Volume 1:Figure 3.27). The use-wear analysis by Aoyama suggests that they were used for stone carving (Volume 2:85–90). Along with the similar axes found in front of the north room, they formed a tool kit of a stone sculptor, who may have been responsible for carving stelae and other monuments for the Aguateca ruler. Although the carving of small objects may have been done in this room or the area nearby, large monuments were probably worked after they were set in the plaza and other locations. The carver, who was probably the head of this household, appears to have stored his tools in this room when they were not in use. Female-related artifacts were scarce in this room. One bone pin and two spindle whorls may have been used by females, but we should consider the possibility that they served functions other than textile production, including the use of spindle whorls as flywheels for drills. The room was equipped with a drainage hole in the southwestern corner, indicating the use of water, and the large storage jars found in this room possibly contained water. Aoyama (Volume 2:92) states that a considerably higher percentage of lithic tools from this structure were used for meat or hide processing than in Structure M8-4. The use of water in the north addition seems consistent with this type of activity.

Given the scarcity of female-related artifacts and food preparation implements other than ceramic vessels, the main activity carried out in the north addition may have been craft work using skins or leather rather than meat processing for food. The limestone tool generally called a bark beater that was found in this room suggests that the residents may also have worked with bark cloth there. The primary association with craft work rather than food preparation is also suggested by the relatively low phosphate levels in this area (Terry et al. 2004) and the scarcity of food remains (Chapter 10). In particular, the flat limestone with many fine, parallel incisions found in this room (Cat. 20A1632-1, Figures 5.40 and 5.41, Volume 1:Figure 3.26) may have served as a work surface for hide working or bark processing. But if hide or bark was used for the production of costumes, ceremonial gear, or furniture, the near absence of bone awls and needles in this room indicates that its sewing took place in other locations, possibly in the north room or the area behind the structure, where numerous bone tools were found. The stone mortar found in the north addition (Cat. 20A835-1, Volume 2:Figure 4.2c) was rather coarsely made and appears to have been related to materials and activities different from those of the chert palettes from Structure M8-4.

Behind the structure, excavators found numerous artifacts, including ceramic vessels, figurines, and grinding stones. The area along the back wall of the structure was probably covered by an eave and served as a storage and working space. Activities carried out there probably include food preparation, as suggested by the presence of several metates in the northern part of this area, although three of them found near the northwestern limit of excavation may have fallen down from Structure M7-34. This use of the area behind the structure is similar to that of Structure M8-10 (Inomata and Stiver 1998). An important difference, however, is that the backyard of Structure M8-8 contained numerous bone tools and figurines whereas these objects were absent or limited in the corresponding part of Structure M8-10. The artifact assemblage of this area of Structure M8-8 is similar to that of the north room (except for the difference in the quantity of shell and greenstone ornaments), and both areas appear to have been closely associated with females. Aoyama (Volume 2: Figure 5.35) found a particularly high percentage of lithic tools used for meat or hide processing in this part. As in the north addition, the soil phosphate levels in the southern part of the area behind the structure were relatively low (soil chemistry analysis was not conducted in the northern part) (Terry et al. 2004), and those tools may have been used primarily for craft work involving hide or leather. Spindle whorls were present, but their number (*n* = 2) was rather low, and some of the bone awls, pins, and needles found in this area may have been used for leather work. The bark beater found in this area suggests possible bark processing here. The use of unfired clay found in this area is not clear.

Near the southwestern corner of the excavated area behind the structure, excavators uncovered a shallow midden. The high phosphate level in this midden indicates that it contained food refuse (Terry et al. 2004). Its contents were probably discarded mainly by the residents of Structure M8-10. The area south of the building also contained a moderate number of ceramic vessels and grinding stones. The use-wear analysis of lithic tools shows traces of bone and shell working, along with more predominant signs of meat or hide processing and wood working (Volume 2:Figure 5.35). The debitage of bone and shell manufacturing, however, is absent (Emery and Aoyama 2007; Chapter 9), and this area may have been used mainly for storage.

In sum, Structure M8-8 presents intriguing similarities to and differences from the other elite residences. Important differences in the artifact assemblages between those structures appear to be related to certain forms of specialization among elite crafters, including scribes, who focused on the production of ceremonial gear, and sculptors. Vexing questions about the activity of the residents remain. If hide and leather processing was indeed an important activity carried out in this structure, how was it related to the carving of stone monuments? If the male head of household was the master carver, was he also involved in hide work? Or was the latter done by his assistants or servants? Did the hide work involve different stages of work, possibly cutting and initial processing in the north addition and sewing and other secondary processing in the area behind the structure? If so, were those processes carried out by the same individuals, or were males responsible for the initial part and females for secondary processing? Likewise, the organization of food preparation suggested for both the north room and the area behind the structure invites questions. Were both areas used on a daily basis? Or was the backyard used mainly for storage with the metates placed there used mainly for large feasts?

Structure M8-13: Operations 14B and C

Structure M8-13 is located to the southeast of Structure M8-10 (House of the Scribe), sharing the same patio. The residents of the two structures were probably closely related, which is also suggested by refitted pieces of obsidian from the two structures (Volume 2:97). The building contained the essential elements of a household assemblage, including ceramic vessels for food preparation, serving, and storage, and grinding stones (Figures 14.20–14.24). The quantity of shell and greenstone ornaments was substantially lower than in Structures M7-35, M8-4, M8-8, and M8-10, indicating that the residents were lower-ranked elite. This interpretation is supported by the small size and the lower quality of construction of this building. Both lithic and faunal data analyzed by Aoyama and Emery (Volume 2; Chapter 9) indicate that bone working was an important activity carried out by the residents. However, there is no evidence of scribal work or highly skilled artistic production comparable to that of the other elite residences. The west room probably served for food preparation and storage, as well as for bone tool production. The center room contained the largest number of ceramic vessels in this structure, and its use appears to have been somewhat different from that of the other elite residences. The east room was only partially excavated, but the quantity of artifacts appears to have been small. As in the cases of the other residences, the area behind the structure was used as a storage and working area, but the runoff from the nearby midden probably hindered the effective use of its western portion.

The center room was equipped with a rear bench facing toward the patio, which suggests that this chamber, like the center rooms of other elite residences, was used for courtly meetings. However, the artifact assemblage from this room presents important differences from those of other center rooms. Although the bench was largely clean of artifacts, the floor in front of it was cluttered with vessels. The number of ceramic vessels associated with this room (*n* = 32) is the highest in this structure, and higher than those in the center rooms of other elite residences. In addition, Lentz identified remains of squash and huiscoyol from this room (Chapter 10). The center room of Structure M8-13 may have been the primary area of food consumption, and certain foods and liquids may have been stored here. The number of spindle whorls found in this room (*n* = 2) is higher than the numbers in the west room (*n* = 1), the east room (*n* = 0), and behind the structure (*n* = 1), and so are pointed bone tools (5 in the center

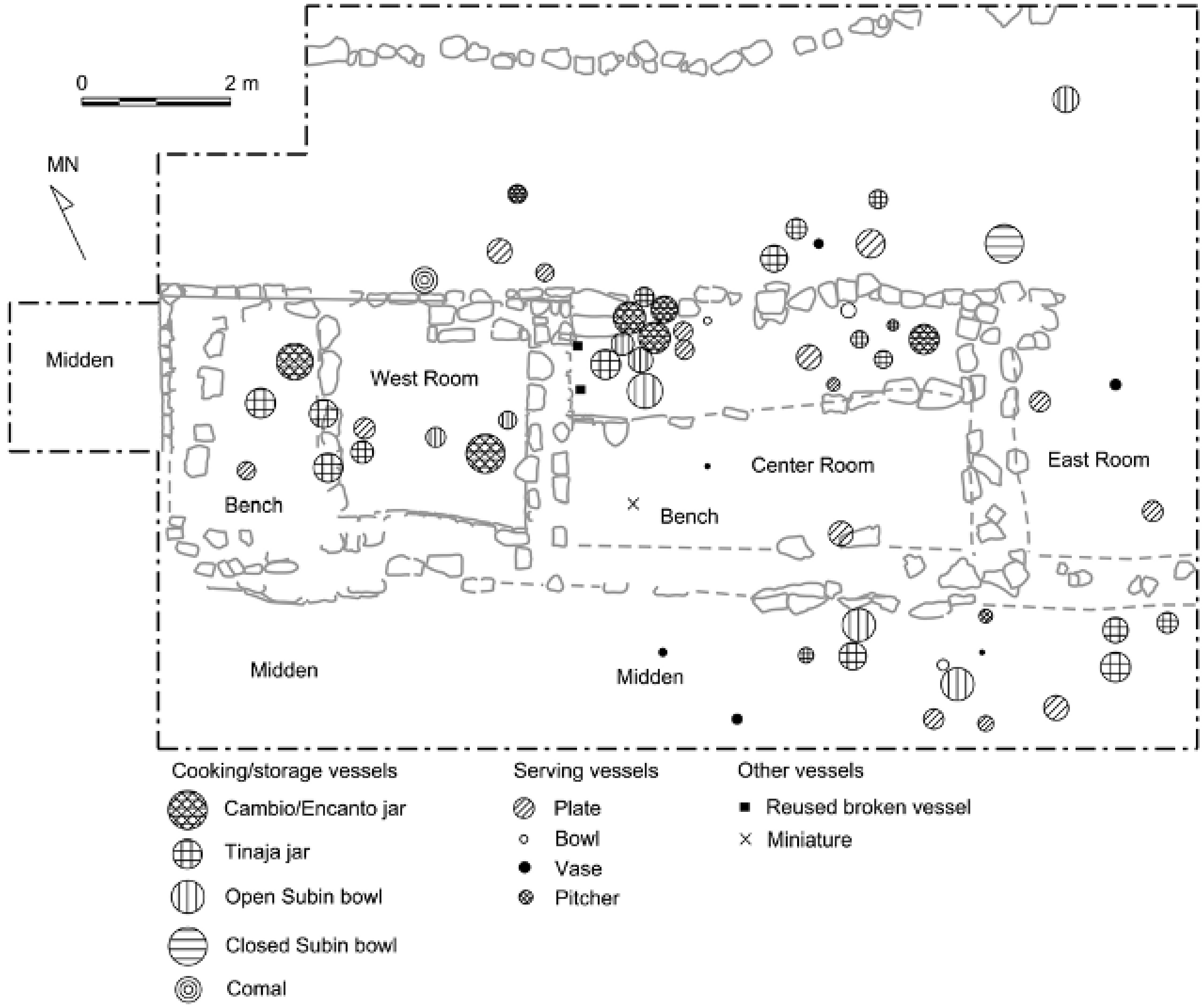


Figure 14.20. Distribution of ceramic vessels in Structure M8-13.

room, 3 in the west room, 0 in the east room, and 2 behind the structure) and figurines (4 in the center room, 0 in the west room, 1 in the east room, and 2 behind the structure). In other elite residences, these artifacts are closely correlated to the areas of food preparation and storage and are considered to have been used mainly by females. If so, a female (or females) may have spent a considerable amount of time in the center room of Structure M8-13.

The west room contained large storage vessels and two large metates, which are most likely related to the room's function of food preparation and storage. One of the limestone metates (Cat. 14B552-1) was thick and new whereas the other (Cat. 14B360-1) was thin and nearly worn through (Figure 5.19). The residents may have just replaced the old one with the new one. The fragments of the old metate were found on the collapsed front wall, and it may have been temporarily discarded on top of the wall. Aoyama and Emery have found strong evidence of bone working in lithic use-wear and faunal remains in this room, as well as in the patio area in front of the building and the area behind the building (Volume 2; Chapter 9; Emery and Aoyama 2007). Next to this room was a dense midden containing numerous ceramic fragments, lithics, and probable food refuse. The midden contents flowed into a substantial part of the area behind Structure M8-13, creating an unhygienic condition for the residents of this building. Although a substantial part of the midden contents may have been discarded by the residents of Structure M8-10, the refitting of lithic materials by Aoyama shows that the residents of M8-13 also deposited their trash in this midden (Volume 2). The midden also contained a large amount of bone-working debitage, as well as some

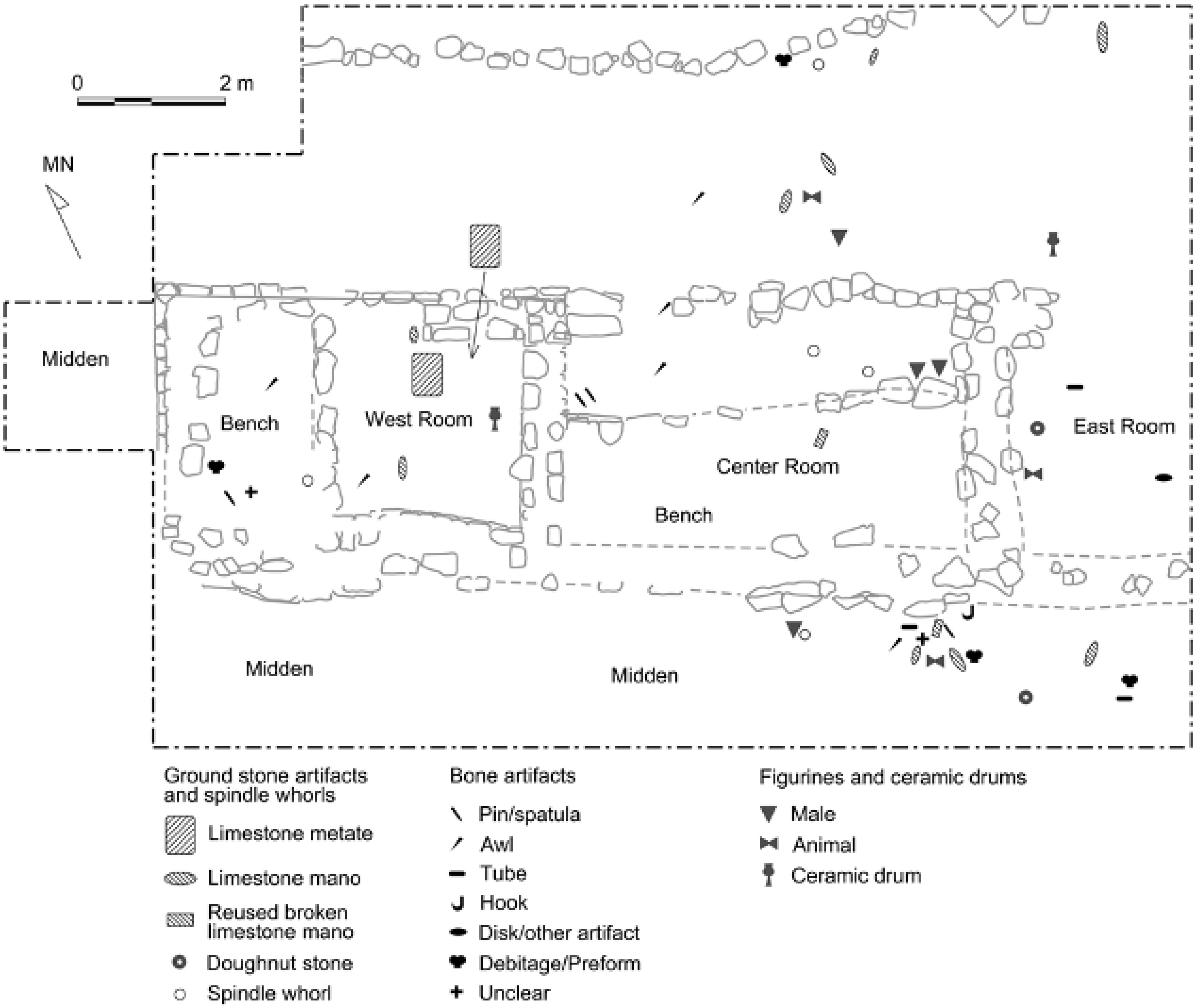


FIGURE 14.21. Distribution of grinding stone artifacts, spindle whorls, bone artifacts, and figurines in Structure M8-13.

shell-working debris, and some of it was undoubtedly discarded by the residents of Structure M8-13 (Emery and Aoyama 2007). A substantial amount of bone-working debitage was also found in the covered drainage flowing from the area behind Structure M8-10 into this midden, indicating that the residents of Structure M8-10 also engaged in bone working.

The function of the partially excavated east room is not clear, but it did not have a bench and may have been some kind of work area. The eastern half of the area behind the structure that was not covered by the runoff from the midden may have been a work and storage area. The activities conducted in this area probably include food preparation and storage, wood working, and the manufacture of bone and shell artifacts (Volume 2; Chapter 9; Emery and Aoyama 2007).

The residents of Structure M8-13 formed a household with its own food preparation and storage functions, although their lives were closely tied to the higher-status residents of Structure M8-10. I originally suggested that this structure was occupied by a secondary wife (and her servants) of the elite scribe of Structure M8-10, and that this female possibly spent substantial time in the center room as the head of this household. This organization may have resulted in the higher numbers of female-related artifacts in this room (Inomata et al. 2002). Aoyama (Volume 2:99), however, noted that this structure contained a larger number of bifacial points ($n = 42$) than the other excavated buildings. Although some of these points may have been used for food preparation and manufacturing work, others possibly served as weapons. Aoyama suggests that the residents of the building participated in battles.

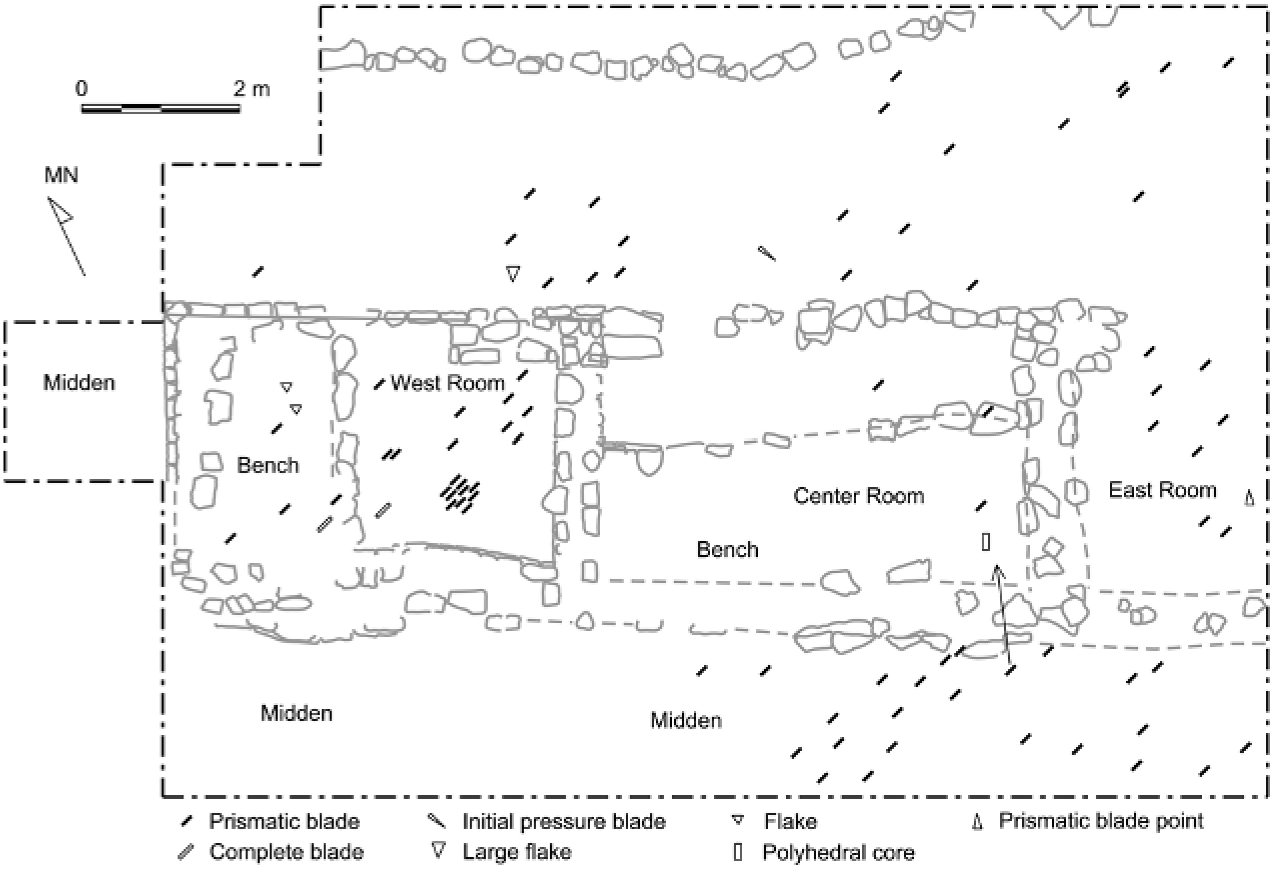


Figure 14.22. Distribution of obsidian artifacts in Structure M8-13.

This interpretation implies a strong male presence in this structure, although we cannot dismiss the possibility that a small number of females participated in battles. Given this information, it appears more likely that Structure M8-13 was occupied by a nuclear family, a male and a female without children or with infants, who may have been younger members of the kin group of the scribe of Structure M8-10. This interpretation is consistent with the pattern of space use of this building. Because the bench of the west room was largely taken up by large storage vessels, the bench of the center room was the only potential resting and sleeping space in this building. It is probable that a young couple (and infants if any) ate and slept together on this bench. This possibly resulted in a division of gendered spaces that is less clear than those of the other elite residences. It is not clear whether bone working was conducted by the male or female resident. The eastern room with a smaller quantity of objects may have been a room underutilized by this family that was in the early stage of its household developmental cycle. When their children grew, a bench would have been added to this room to be used in a manner similar to that of the side rooms of the other elite residences.

Structures M8-2 and M8-3: Operation 23B

Structures M8-2 and M8-3, small buildings of relatively poor quality, represent a striking difference from the elite residences. The quantity of artifacts associated with these buildings is substantially smaller than in the elite residences, but the common elements of food preparation, storage, and craft activities are present (Figures 14.25–14.29). The project members have debated whether these buildings represent residences of low-status households or nonresidential workshops (Inomata et al. 2002). After reviewing the results of all analyses, I am now inclined to think that the two structures, and possibly the nearby Structure M8-1, were occupied as one residential unit by one household of low status, whose members probably worked as servants or assistants of the elite courtiers. Structure M8-2, without benches, was probably used mainly for food preparation whereas Structure M8-3, with a bench, appears to have been a living space. The latter also

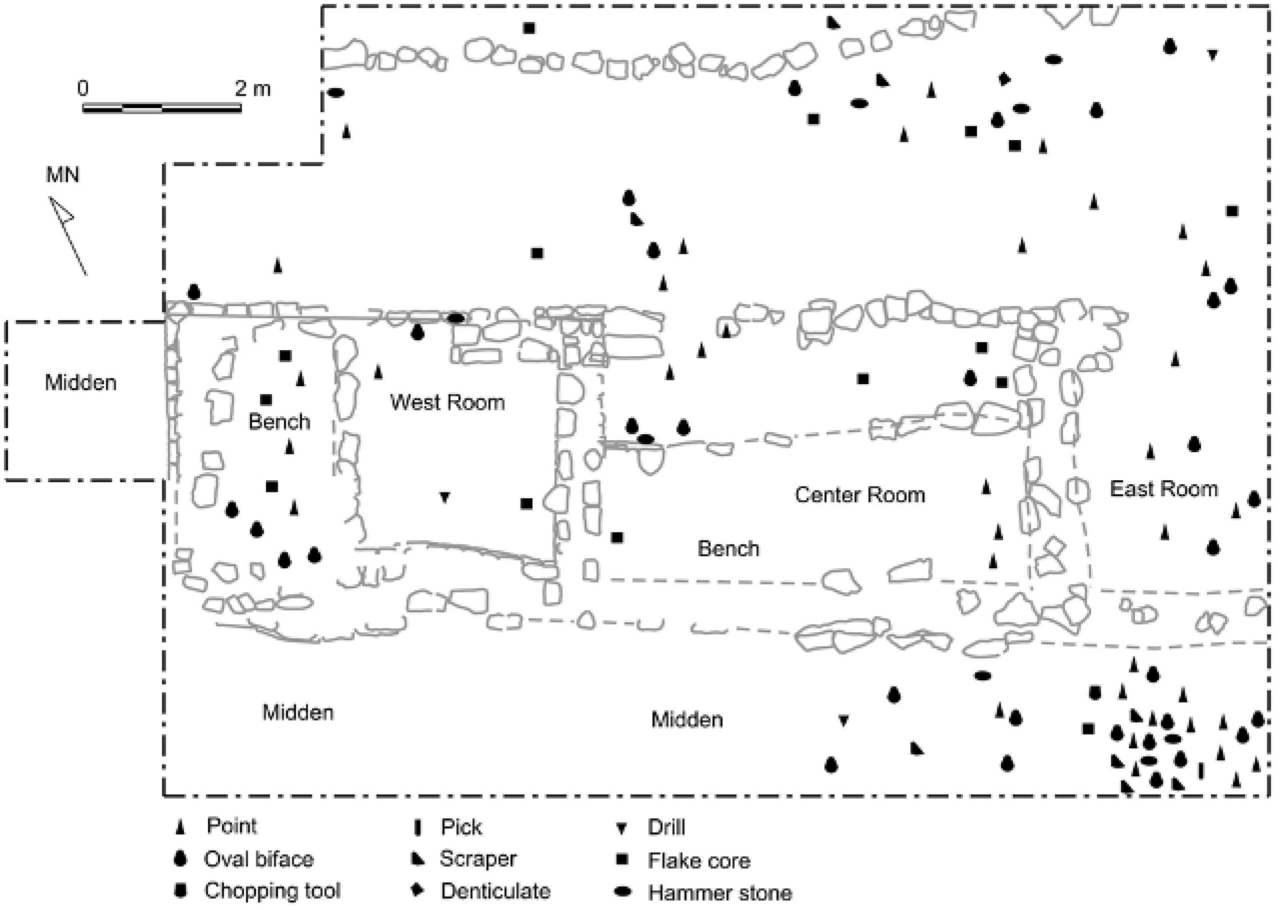


FIGURE 14.23. Distribution of chipped stone tools and related artifacts in Structure M8-13.

served for manufacturing work of unclear nature. As in the case of Structure M8-13, the division of male and female spaces is less clear than in the high-status elite residences, and spindle whorls and bone tools for textile production are found in both structures. Emery, however, notes that faunal remains from these structures do not represent a typical range of food taxa and elements, and the possibility that they were specialized buildings for craft production should still be considered (Chapter 9).

The area in front of Structure M8-2 (up to the back wall of Structure M8-3), where two limestone metates and eight manos were found, appears to have been the primary food preparation area. It is probable that the interior of the building was also used for this work, but the quantity of artifacts found there is fairly small. Excavators found a dense concentration of sherds and other artifacts in the exterior area immediately west of Structure M8-2. The nature of this deposit was difficult to evaluate, but the high phosphate levels detected in soil chemistry analysis indicate that it was a midden where food refuse was thrown (Terry et al. 2004). The area immediately south of this midden, near the southwestern corner of Structure M8-2, was probably used as a storage and work area: excavators revealed reconstructible vessels and nicely arranged manos here (Volume 1:Figure 3.48). The lithic use-wear analysis by Aoyama shows that a high percentage of stone tools associated with Structure M8-2 were used for meat or hide processing, which is consistent with the interpretation of food preparation in this area (Volume 2). The two spindle whorls, five pointed bone tools, and eight figurines in and around Structure M8-2 (one additional figurine in the area behind the structure) were probably associated mainly with females. In this regard, Structure M8-2 is comparable to the side rooms of the elite residences, which were used for food preparation and storage.

In the area behind Structure M8-2, excavators found several reconstructible vessels and numerous shell ornaments with possible evidence of shell working (Chapter 9). The abundance of marine shell ornaments in this area makes a clear contrast to the paucity of prestige goods

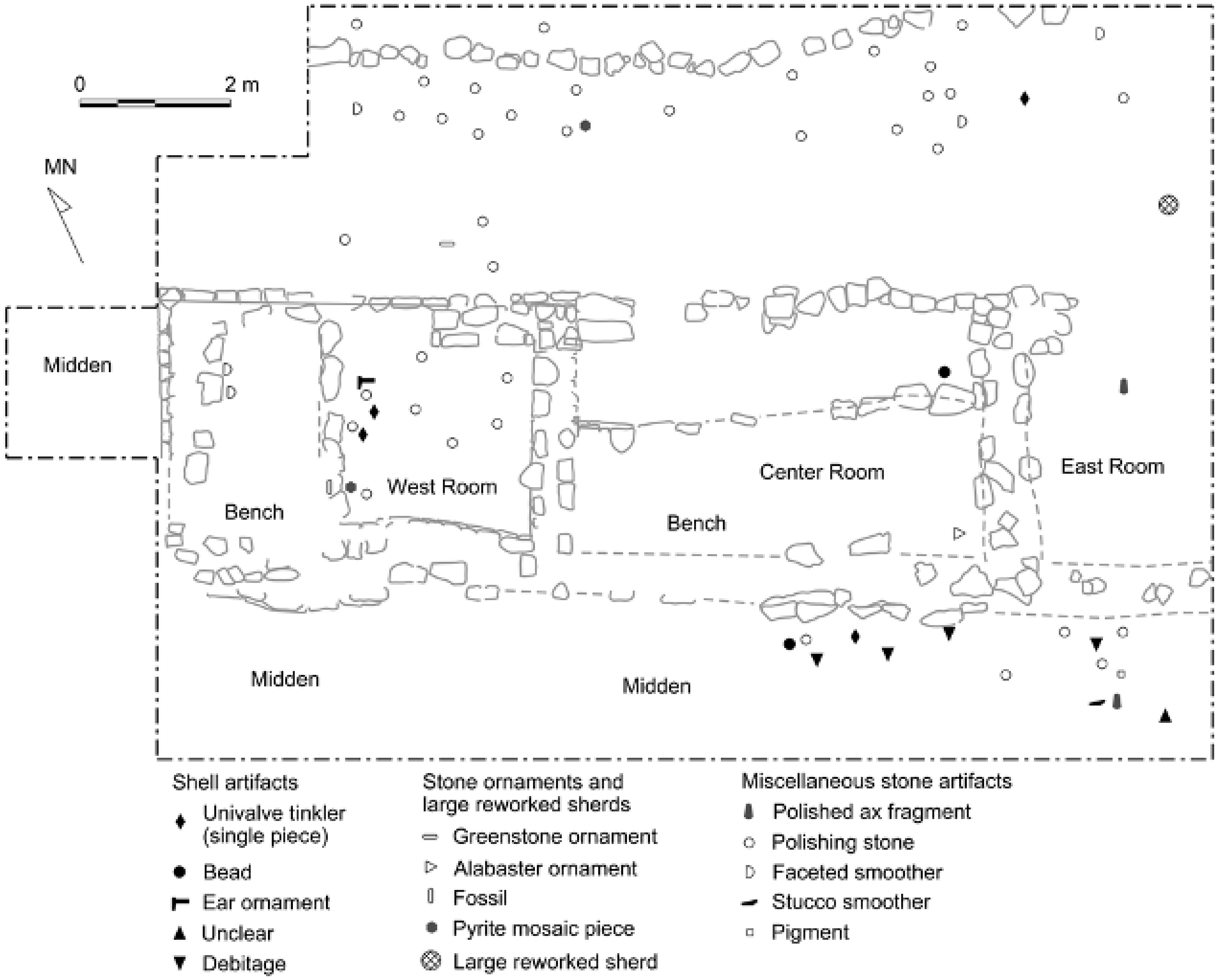


FIGURE 14.24. Distribution of polished axes, polishing stones, pigments, shell artifacts, stone ornaments, and large worked sherds in Structure M8-13.

in the rest of Structures M8-2 and M8-3. It is important to evaluate whether the residents of Structure M8-2 produced shell ornaments for other households or whether these objects had fallen down from the nearby Palace Group during or after abandonment. Whereas Emery favors the former interpretation (Chapter 9), I prefer the latter, for the following reasons. In the use-wear analysis by Aoyama of lithic tools associated with Structure M8-2, evidence of shell working was weak (Volume 2:104). In addition, if shell working was conducted there, we would expect a substantial amount of shell-working debitage deposited in the midden next to Structure M8-2, but this was not the case. An even stronger indication of artifact transposition comes from ceramic analysis. A substantial quantity of large ceramic fragments was found in this area, and some were classified as reconstructible vessels. But these fragments of refitted vessels were scattered, and none of the reconstructed vessels had a large portion of its fragments in one concentration. This pattern makes a clear contrast to many other vessels from other areas that broke in situ. Relatively small portions of vessels were refitted, and we estimated that an average of 41 percent of the total mass of reconstructible vessels was presented in the excavated materials (Volume 1). This number is substantially smaller than those found in outside areas adjacent to other structures, including 57 percent for the area south of Structure M8-4 and 77 percent for the area behind Structure M8-8. Vessels from the area behind Structure M8-13 were poorly preserved, probably because of mixing with the runoff from the midden, but the percentage (45 percent) is still higher than that of the area behind Structure M8-2. These patterns suggest that most of the materials found in the area behind Structure M8-2, including ceramic vessels and shell ornaments, were not originally deposited there

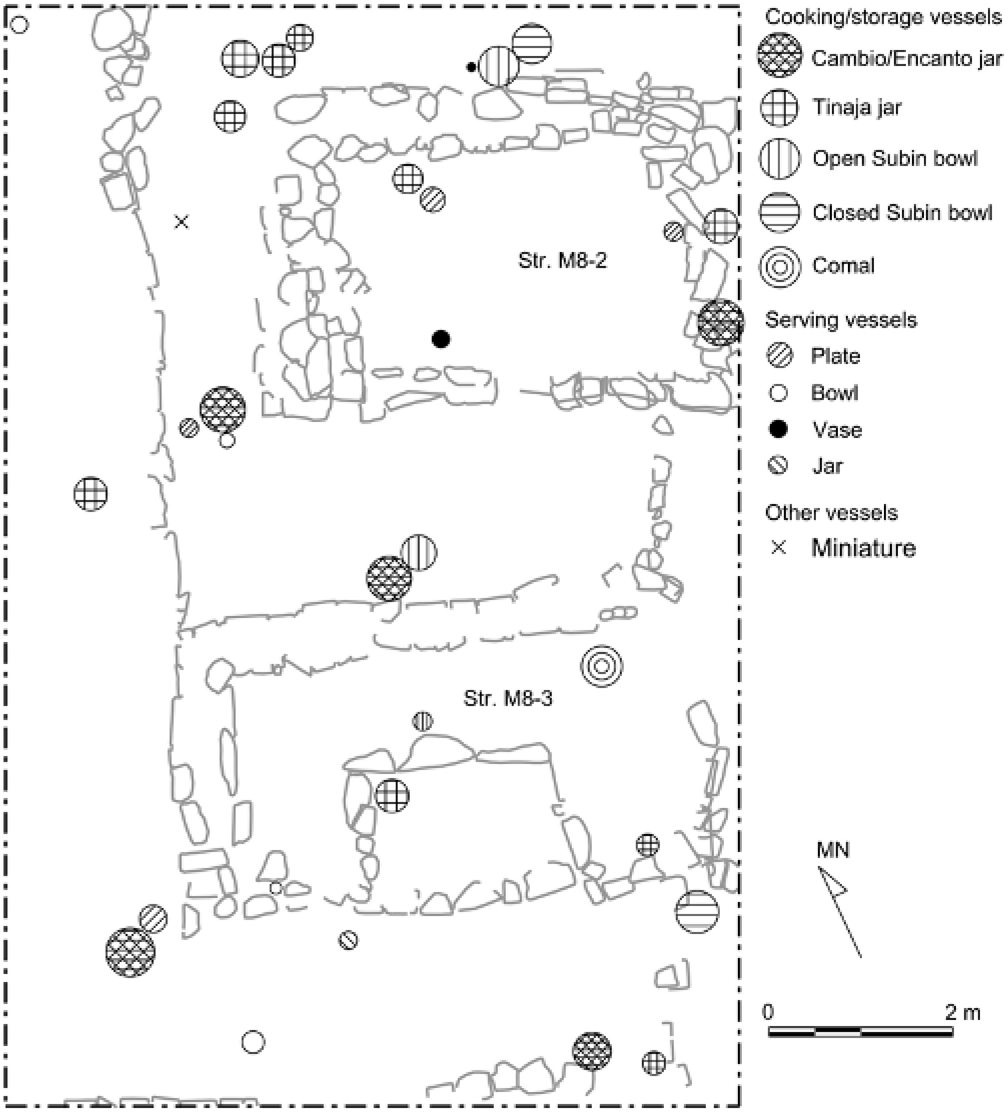


Figure 14.25. Distribution of ceramic vessels in Structures M8-2 and M8-3.

by the residents of the building but had fallen down from the Palace Group. If so, the material inventory of Structures M8-2 and M8-3 was substantially poorer than those of the elite residences.

Structure M8-3, with a bench, may have been the primary living space for this household, or alternatively the unexcavated Structure M8-1 may have served this function. The presence of three spindle whorls in this building (and possibly two that were found in front of the building) suggests that a female spent substantial time here, possibly with her spouse. The number of bone tools for textile production was smaller than that in Structure M8-2. This building was also an important area of manufacturing activity. The primary craft work must have been one related to the six flat limestone block and mano-like objects, although the nature of this activity remains unclear (Figures 5.42 and 5.43). A ball of specular hematite was found in this building (Volume 1:Figure 3.49), and the soil chemistry analysis by Terry detected high concentrations of iron and other metals in the unexcavated area east of Structures M8-2 and M8-3 (Terry et al. 2004). The manufacturing activity carried out in and around Structure M8-3 probably involved the use of mineral-based pigments. One possibility is hide work, which may have been related to the suggested hide work in Structure M8-4. Some figurines and lithics were found near the southern edge of the excavated area, but for the same reason I discussed for the area behind Structure M8-2, I believe that most of these objects had fallen down from the nearby Structure M8-5.

The small number of objects and the absence of pres-

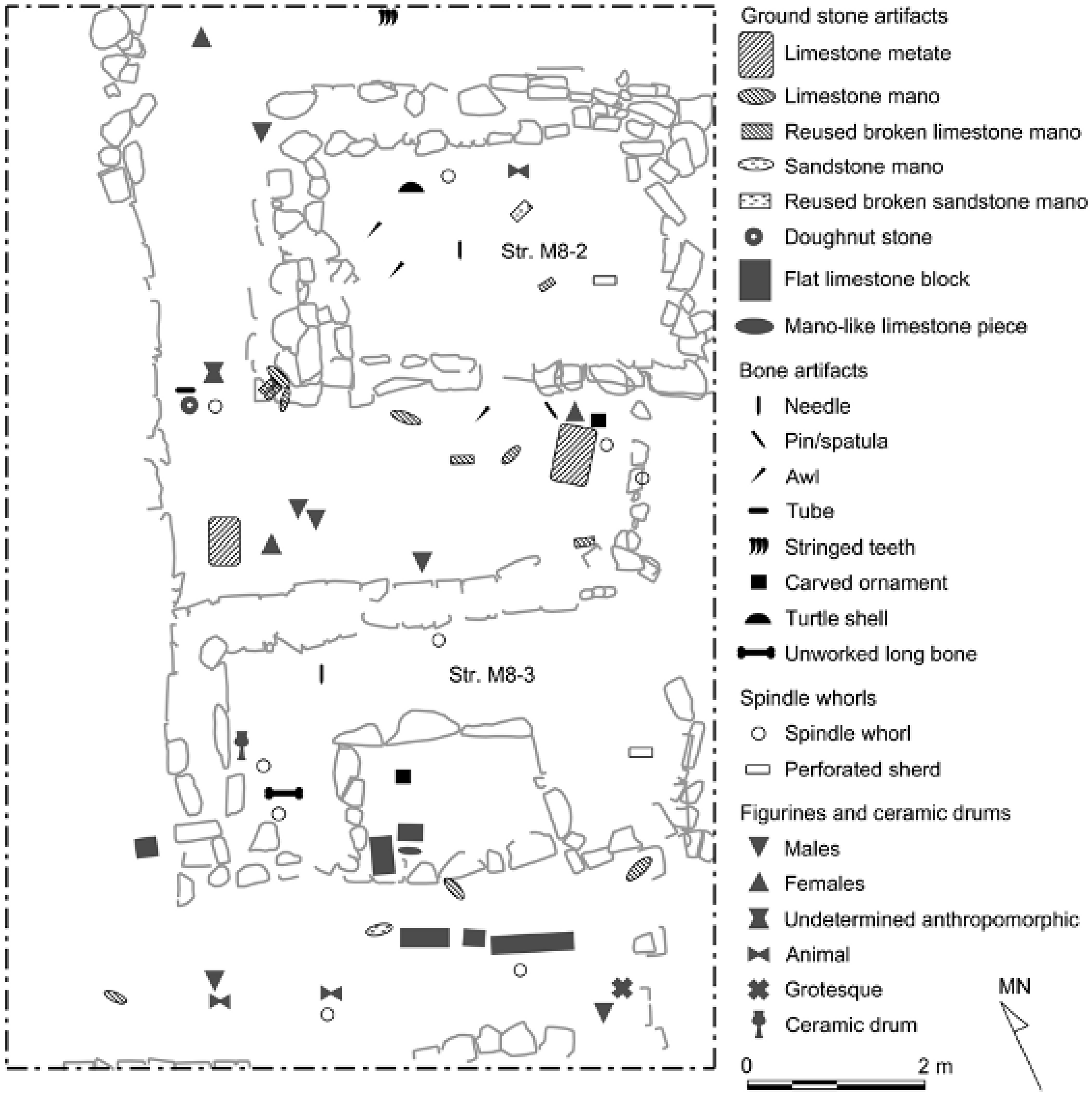


Figure 14.26. Distribution of grinding stone artifacts, flat limestone blocks, spindle whorls, bone artifacts, and figurines in Structures M8-2 and M8-3.

tige goods, as well as the poor quality of the buildings, suggest that the residents of Structures M8-2 and M8-3 were of low status and probably did not belong to the same kin groups as the residents of the elite structures. They possibly worked as servants or assistants of the elite courtiers. The residents apparently prepared their food, although the storage capacity indicated by the quantity of ceramic vessels was relatively small. The relatively small number of objects also suggests that Structure M8-2 was not a specialized kitchen for the surrounding elite households. An interesting finding is that, except for one case, the metates and manos found in and around Structures M8-2 and M8-3 do not match with each other. Potential matches were found with the metates and manos of Structure M8-4, as well as those of Structure M7-34, implying certain relations between the households of Structures M8-2/3 and M8-4 (see Chapter 5, Figure 5.37). The residents of Structures M8-2 and M8-3 may have helped their masters who lived in Structure M8-4 with food preparation, and they may also have worked in M7-34 on certain occasions. The relationship between the residents of Structure M8-4 and those of Structures M8-2 and M8-3 is also indicated by the refitting of chert lithics from the two areas by Aoyama (Volume 2:Table 3.6). If my interpretation that Structures M8-1, M8-2, and M8-3 were occupied by one household is correct, the use of each of these small buildings appears roughly analogous to the uses of individual rooms of the multiroom residences.

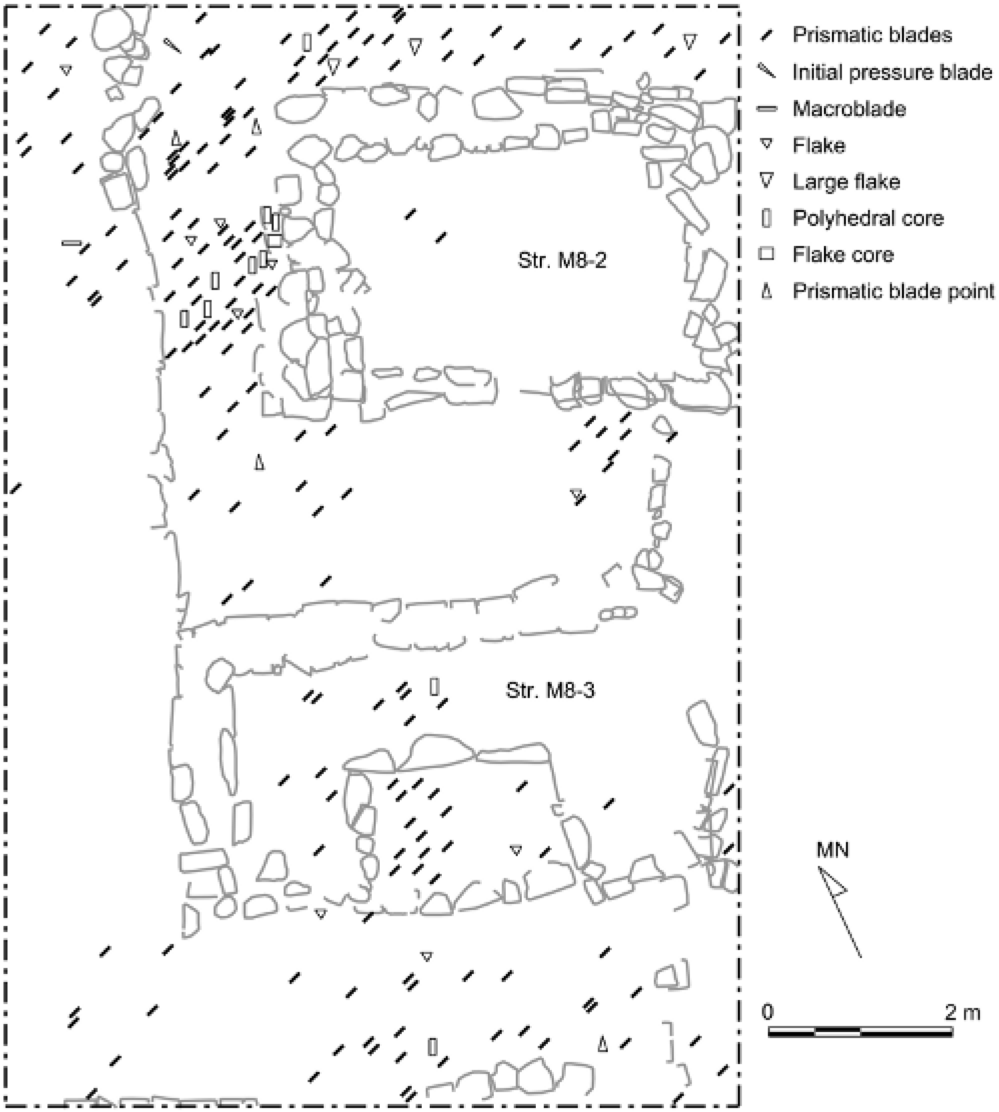


FIGURE 14.27. Distribution of obsidian artifacts in Structures M8-2 and M8-3.

Structure M7-34 (House of Metates): Operation 21A

Structure M7-34, facing the Causeway, had an architectural configuration similar to that of the elite residences, but the distribution of its artifacts was unique (Figures 14.30–14.34). Large metates were found throughout the building and the surrounding areas, and divisions of different activity areas are less clear than in the elite residences. Food preparation must have been a particularly important activity associated with this building. Remains of maize, avocado, nance, fig, and chile pepper found there were probably related to these activities (Chapter 10). There is also evidence of various kinds of craft production, including textile, figurine, and wood working, but not of highly skilled artistic production by elite scribes or carvers. Female-related objects, including spindle whorls and bone tools for textile production, were found scattered throughout the structure and the surrounding areas. The division of gendered spaces is not clear, although the center room may hint at a stronger association with males. Shell and greenstone ornaments are present, but their numbers are substantially smaller than in the high elite residences.

The presence of numerous metates has led us to propose a hypothesis that this was a communal house where many individuals gathered for meetings, ritual, and feasting. Although I think that this is still a viable scenario, we also need to consider other possibilities. Emery indicates that faunal remains from Structure M7-34 do not represent typical food refuse, although she suggests the possibil-

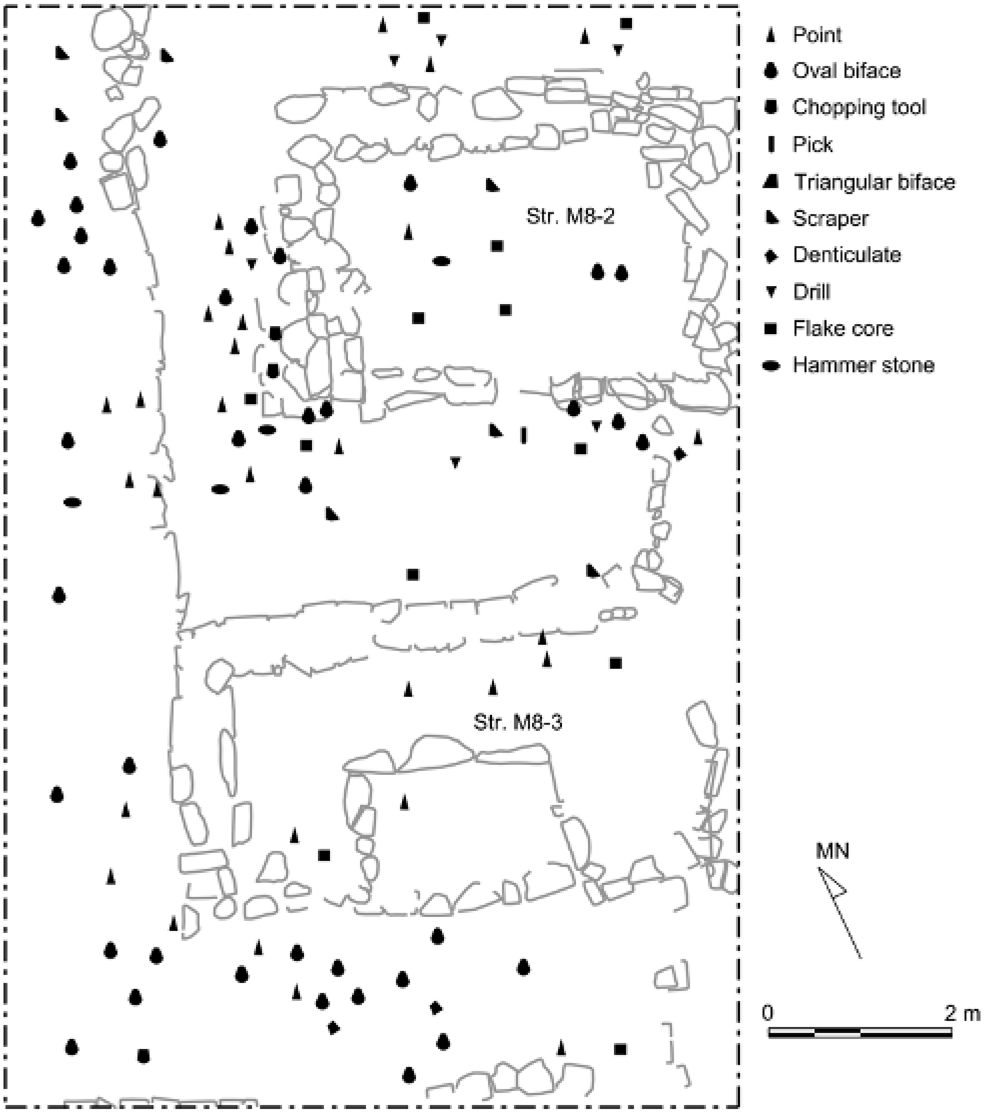


Figure 14.28. Distribution of chipped stone tools and related artifacts in Structures M8-2 and M8-3.

ity that animals were butchered in Structures M7-91 and M7-92 and that prepared food was consumed in Structure M7-34 (Chapter 9). In addition, Structure M7-34 was surrounded by circumferential walls, which were most likely added for defense toward the end of the occupation at Aguateca. If so, the use and function of this building may have changed substantially under the threat of enemy attack. Small platforms, Structures M7-91 and M7-92, were probably added after the construction of the walls. The rate of refitted ceramics is relatively low throughout this area, and we need to consider the possibility that the structures were disturbed at the time of abandonment or were scavenged afterward (Volume 1:Chapter 10). In Tables 14.1 and 14.2 and the following discussion, the front yard refers to the western part of the open area between Structure M7-34 and the circumferential walls, and the Causeway refers to the northwestern part of the excavated area outside the wall.

The center room contained a large limestone metate in the center of the room floor, marking a substantial divergence from the patterns found in the elite residences. Besides this object, however, the number of artifacts found in this room was relatively small, as in the center rooms of the elite residences. In particular, artifacts with possible female associations (spindle whorls, bone tools for textile production, and figurines) were nearly absent in a large part of the center room. As in the elite residences, the center room may have been the focal point of male-centered political

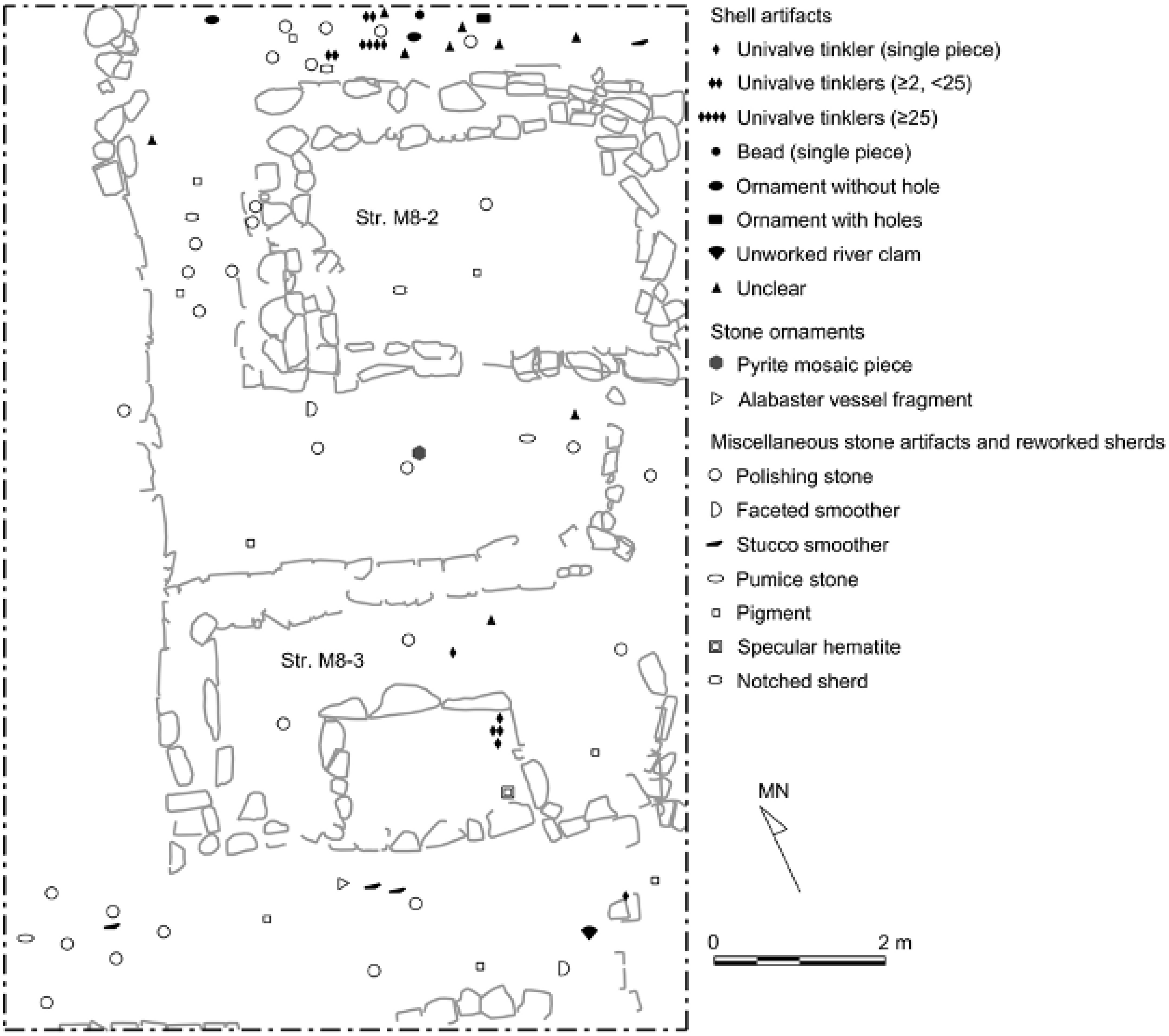


Figure 14.29. Distribution of polishing stones, pigments, shell artifacts, and stone ornaments in Structures M8-2 and M8-3.

and ceremonial gathering and interaction. The presence of avocado, wild fig, and maize remains suggests food consumption (Chapter 10). It is not clear whether the unusual addition of a metate in this room reflects the structure's unique function as a communal house or whether it is because of a change in the use of the building under military threat. The presence of a molded incensario (Cat. 310385, Volume 1:Figure 8.46c) in front of this room points to ritual activity.

In the front part of the north room and in the area in front of it, excavators found numerous vessels and four limestone metates. Thus, the use of the north room may have been somewhat comparable to that of the north rooms of Structures M8-4 and M8-8, with a strong emphasis on food preparation and storage. Two figurine molds were found in this room, which suggests the production of figurines in this area (Figure 2.1a, c). One of them was found with a large worked sherd, and an additional large worked sherd was unearthed in the area north of the buildings (Figure 3.5b, c). The association of figurine molds and large worked sherds was also identified in Structure M8-4, suggesting their use for figurine production. A notable find was a concentration of numerous obsidian blades and flakes in front of the bench of this room. They appear to have been stored in a bag or basket placed on the bench, a shelf, or a beam. In his use-wear analysis, Aoyama has noted that a substantial portion of these obsidian artifacts were used on unidentified materials, reflecting a low

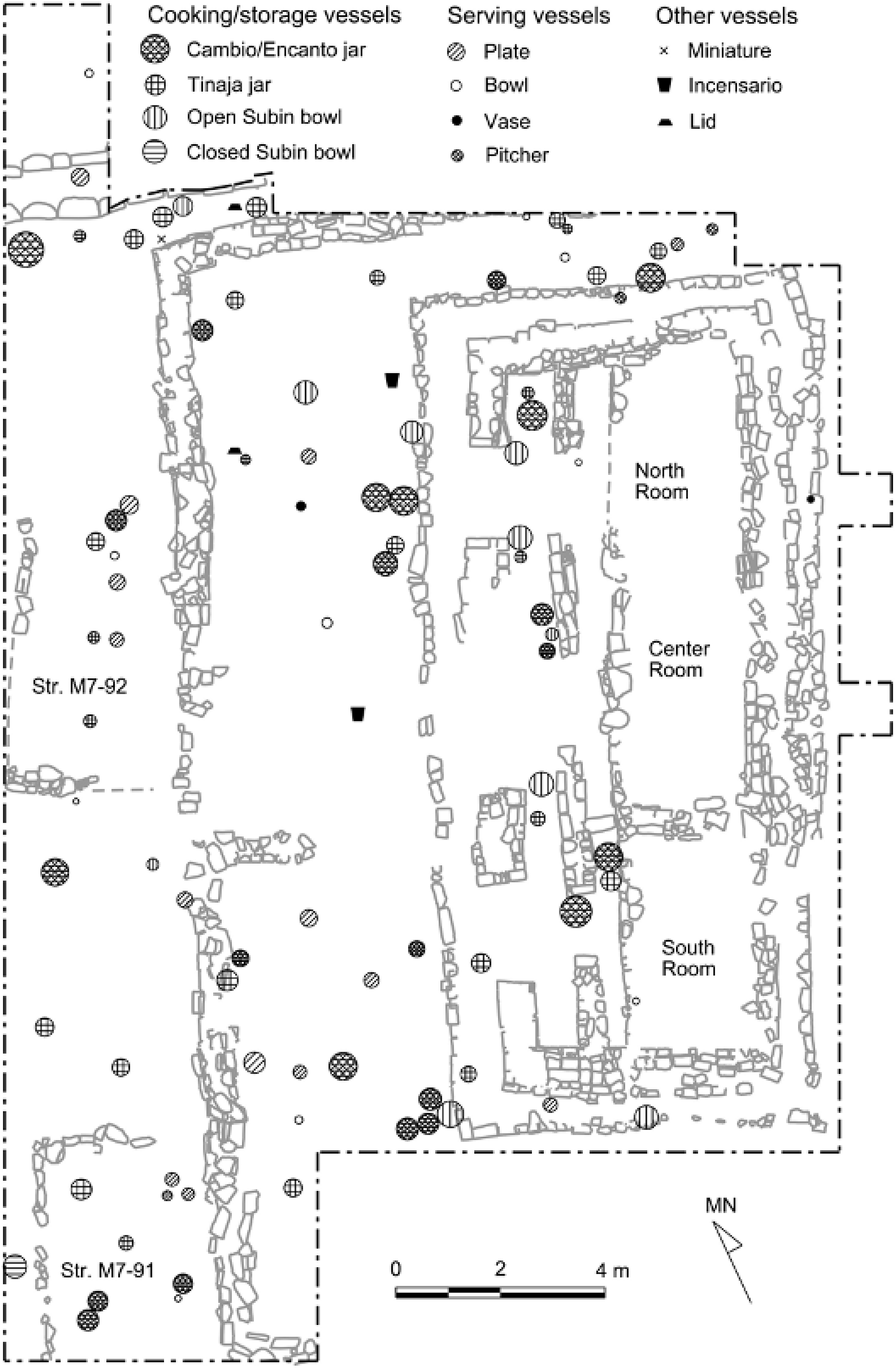


FIGURE 14.30. Distribution of ceramic vessels in Structure M7-34 and the surrounding areas.

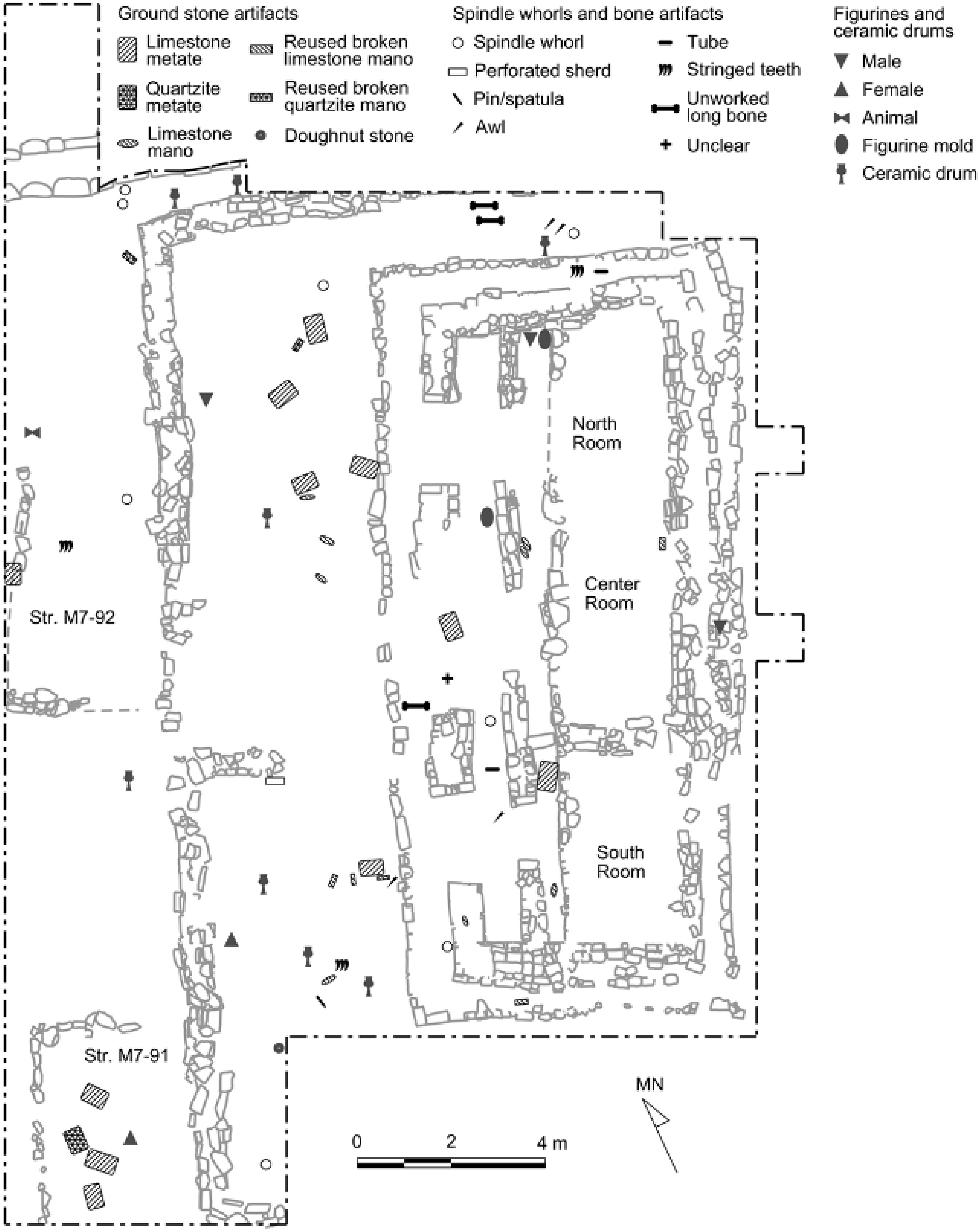


FIGURE 14.31. Distribution of grinding stone artifacts, spindle whorls, bone artifacts, and figurines in Structure M7-34 and the surrounding areas.

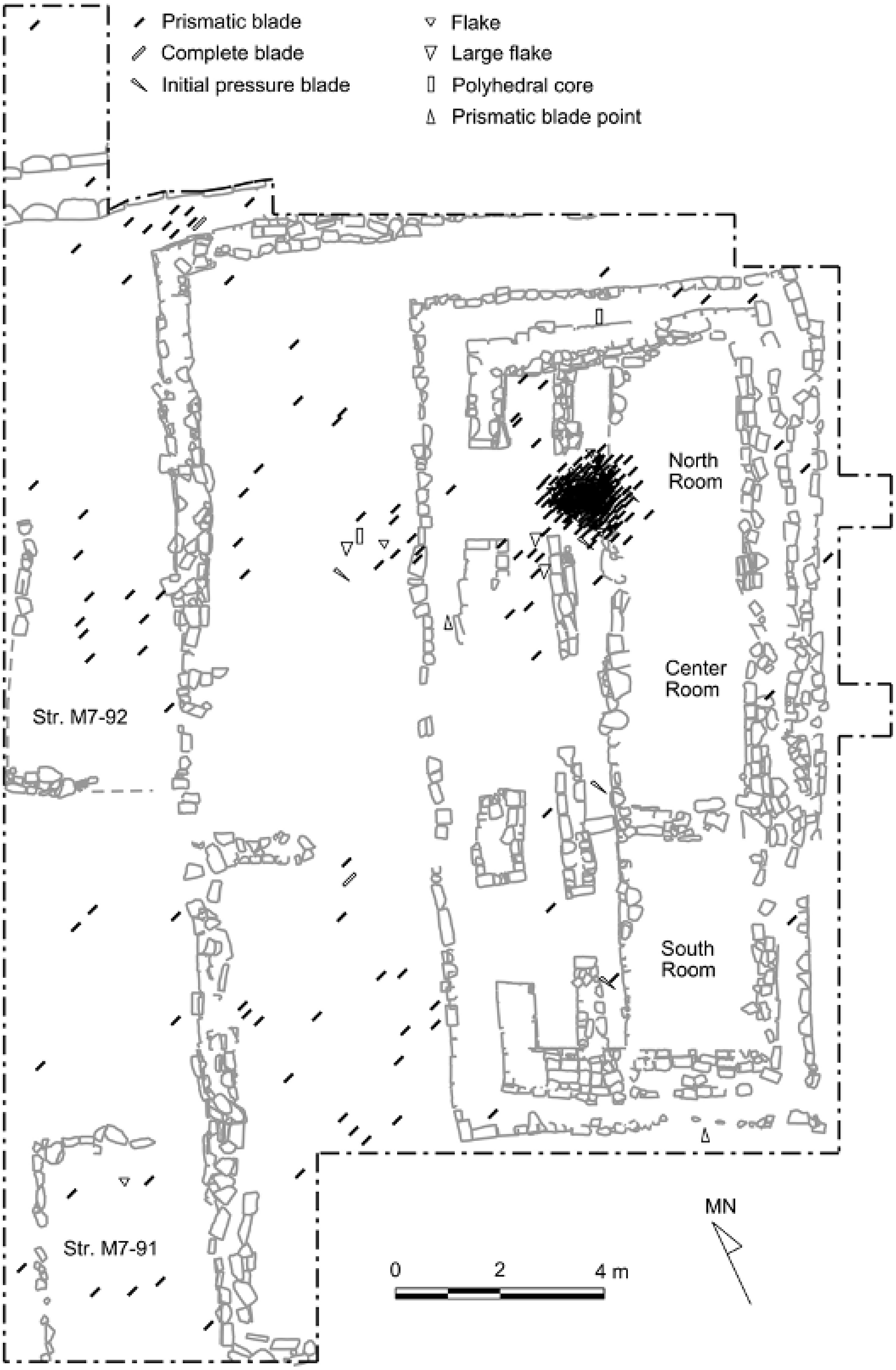


Figure 14.32. Distribution of obsidian artifacts in Structure M7-34 and the surrounding areas.

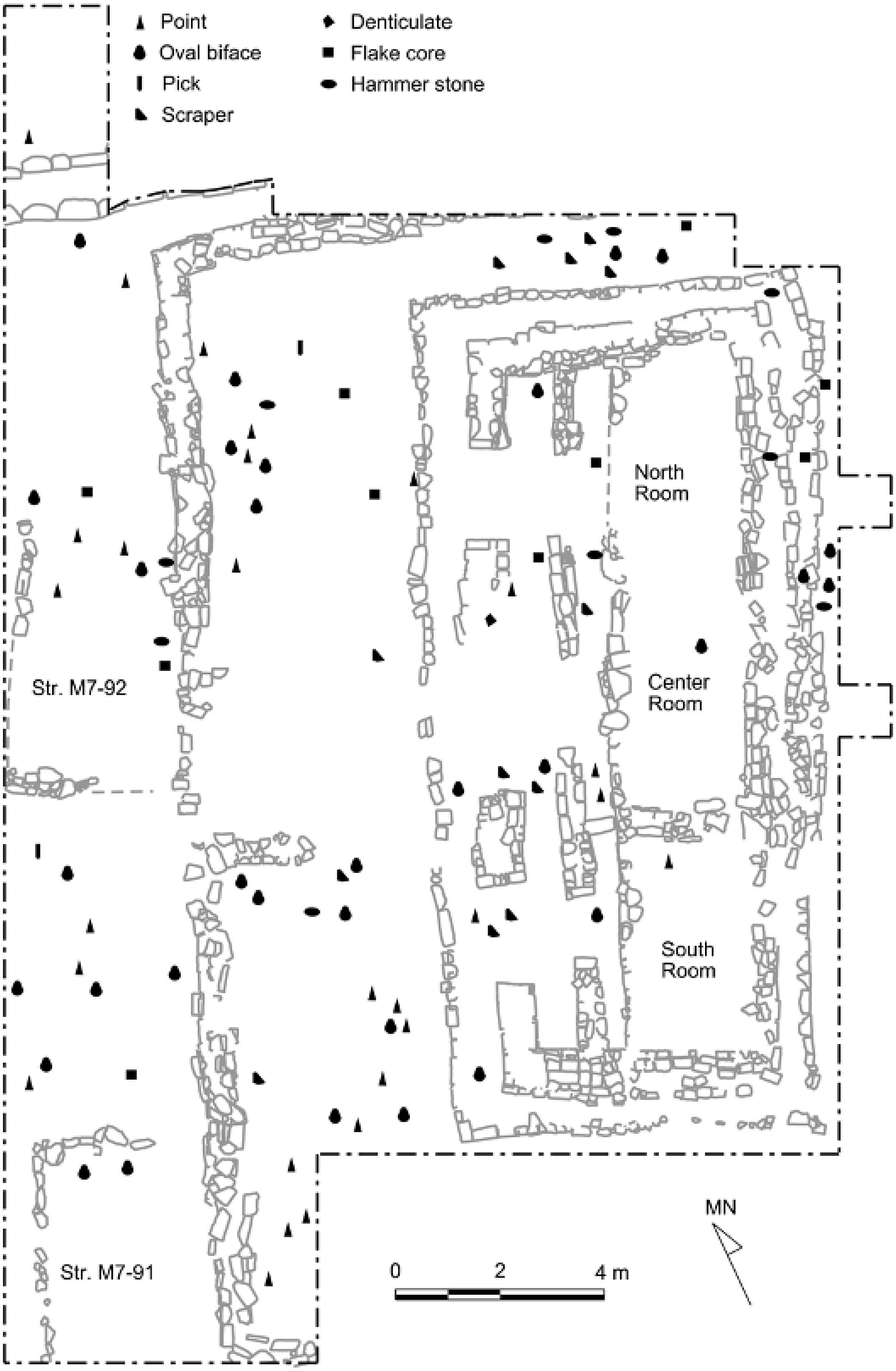


FIGURE 14.33. Distribution of chipped stone tools and related artifacts in Structure M7-34 and the surrounding areas.

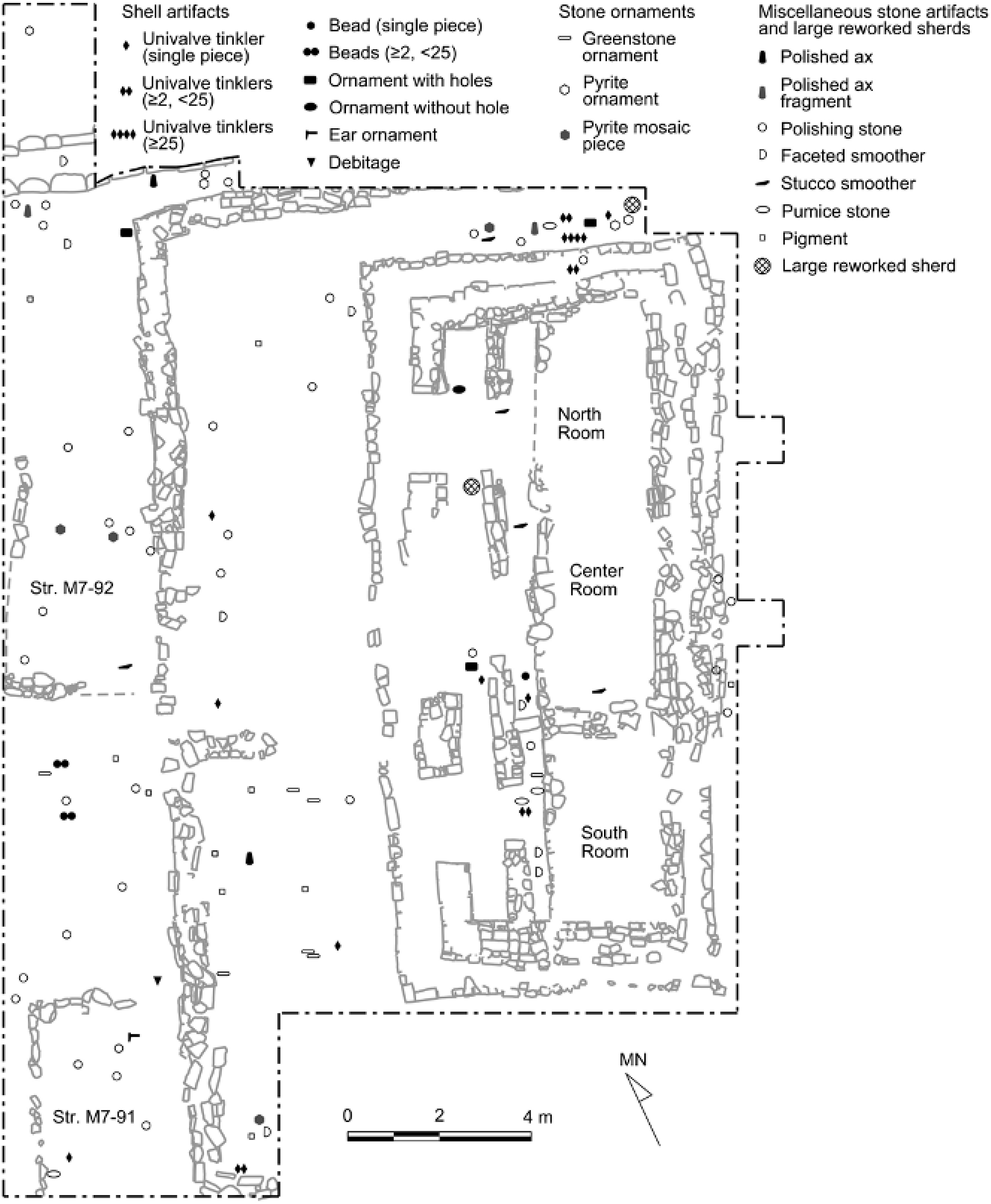


FIGURE 14.34. Distribution of polished axes, polishing stones, pigments, shell artifacts, stone ornaments, and large worked sherds in Structure M7-34 and the surrounding areas.

intensity of use. Other materials that they were used on include meat or hide and wood (Volume 2:Table D63). An elaborate incensario was found in front of this room (Cat. 310050, Volume 1:Figure 8.44).

In the area north of the structure, excavators found twelve ceramic vessels, two bone awls, a spindle whorl, and shell ornaments. The area was probably used for storage and manufacturing, including textile production by females. The south room and the area in front of it contained numerous ceramic vessels and two limestone metates. This area also appears to have been closely tied to food preparation and consumption.

In Structure M7-91, excavators found twelve ceramic vessels and four metates, and there may been more objects in the unexcavated southern part. Structure M7-92 contained only one metate, but about the same quantity of ceramic vessels was present. The presence of numerous ceramic vessels and metates on the platforms, as well as evidence of burning, indicates that these platforms were covered by roofs made of perishable, flammable materials. The construction of these poor-quality structures on the former Causeway reflects a substantial change in the use of this area. Excavators recovered no complete or reconstructible manos in Structures M7-91 and M7-92, which may be because these platforms were primarily work areas and not living spaces. Individuals who worked in Structures M7-91 and M7-92 probably stored their manos in their residences. Emery has identified probable remains of a butchered dog in these structures, and suggests that animals used for the feasts held in Structure M7-34 were processed mainly on these platforms (Chapter 9).

Ceramics and other artifacts were found on the Causeway in the northwestern part of the excavated area. Because a relatively small area of this part was excavated, it is not clear whether they represent a midden or usable items stored there. Either way, they were found in front of and on top of a stairway that connected the Causeway with the entrance to the Palace Group. The stairway was partially blocked by the circumferential wall of Structure M7-34, indicating that the wall was added toward the end of occupation at Aguateca. The construction of the walls and the deposit of these artifacts indicate that the use of the Causeway changed substantially in preparation for potential military confrontations. The shape of Structure M7-92 was not well defined, but it may have blocked a considerable part of the entrance to Structure M7-34, again indicating a substantial modification in the use of this building and related areas.

In sum, whereas the other elite residences appear to have maintained their traditional ways of use relatively well, Structure M7-34 may have undergone a considerable change in function and use during the tense situation. This makes the interpretation of this structure particularly difficult. The most salient feature is the presence of numerous metates, including eleven limestone ones and one quartzite one, which were probably used for grinding maize. They point to the preparation of food in an amount that exceeded the need of one household, which suggests the structure's association with feasting comparable to that of Structure 10 at Cerén (Brown 2001). In broader terms, these activities are not inconsistent with the interpretation that the building served as a communal house. The interpretation is supported by the presence of two incensarios. This type of ceramic vessel is relatively uncommon in elite residences, and their elaborate forms suggest the special function and nature of Structure M7-34. Ringle and Bey (2001:276) have proposed that the colonnaded halls of Mayapan, with their abundant remains of incense burners, were *popol naahs* (council houses documented in Colonial sources) (see also Fash et al. 1992). Also indicative is the largest number of ceramic drums ($n = 7$) found in the excavated structures. Colonial documents suggest that the *popol naah* was used for dances and practice of music in addition to political meetings (Inomata 2006a; Barrera Vásquez 1965). It is impossible to examine whether Structure M7-34 was sponsored by a specific kin group or whether it was community-wide in nature. For this reason, I am reluctant to equate Structure M7-34 of Aguateca with Colonial-period *popol naahs*, but they appear to have shared similar characteristics of communal buildings.

Artifact distributions indicate that the residents of Structure M8-4 were involved in the use of Structure M7-34 and associated areas. Most metates located in Structure M7-34 and in its front yard were found with matching manos in nearby areas, but only two of the five metates from Structures M7-19 and M7-92 may have been used with the manos stored in Structure M7-34. The other metates potentially match with the manos found in the north room of Structure M8-4 (Chapter 5, Figure 5.37). This finding may suggest that the residents of Structure M8-4 or their servants participated in food preparation in this area. The connection with Structure M8-4 is also indicated by Aoyama's refitting of obsidian blades found in Structures M8-4 and M7-91 (Volume 2:Table 2.11).

Another possible interpretation of Structure M7-34 is that it was used as a base for logistical support at the time of battle. Protected by the circumferential walls, the building could also have been used as the final refuge for some elites in the case of an enemy invasion. Most artifacts were found in the front areas or in the front yard of Structure M7-34, and the rear benches were kept mostly free of objects. Thus, this building could have housed a larger number of individuals than common elite residences. These military or emergency functions of the structure are probably not incompatible with its use as a communal house in peacetime. Such communal buildings are more likely to be converted to military use than are common residences.

IMPLICATIONS OF DATA FROM THE RAPIDLY ABANDONED STRUCTURES

Space Use

The data from Structures M8-4 and M8-8, as well as Structures M7-35 and M8-10, excavated during the Petexbatun Project, show that the use of space in elite residences was fairly consistent. A significant part of the center rooms was kept free of objects, and ceramics found in these rooms include medium-sized jars for beverages and serving vessels such as plates, bowls, and vases. These distribution patterns accord with the argument that the central rooms were used for meetings and the reception of visitors (Inomata 1995; Inomata and Stiver 1998; Inomata and Houston 2001a). Some palace scenes depicted on ceramic vases probably took place in the center rooms of elite residences. The sets of ceramic vessels rendered in vase paintings appear roughly parallel to the archaeological assemblages from the central rooms of the Aguateca structures. According to Bishop Landa, the Colonial-period Maya in Yucatan usually held political meetings in the houses of elites (Tozzer 1941). Such practices can probably be traced back to the Classic period.

Another notable point is the presence of scribal implements in the center rooms of Structures M8-4 and M8-10. Some political gatherings may have involved record keeping by scribes. It is also possible that a resident conducted scribal or artistic work in the central room on a regular basis. The majority of the vase paintings of palace meeting scenes depict a male as a protagonist sitting on a bench. It is likely that individuals who used the central rooms for political meetings and scribal work were in most cases males, although females probably participated on certain occasions (Inomata 2008). The presence of an extended male burial under the floor of the central room of Structure M8-10 may imply the primary association of the chamber with males through generations. The center rooms were probably places of daily life as well, and the ceramic vessels found there may have been used for food consumption on a daily basis. The male head of household may have conducted scribal and artistic work as part of routine activity.

Evidence of scribal and artistic work was also found in the south room of Structure M8-4 and the north room of Structure M8-10. Many inscriptions and paintings show that a considerable portion of Classic Maya elites engaged in scribal and artistic tasks and that such creative activities were closely tied to their power, prestige, and identity (Reents-Budet 1994; Coe and Kerr 1997; Coe 1977; Inomata 2001c). It is probable that the same individuals who used the central rooms for political meetings conducted scribal and artistic work in these side rooms, although other members of these households and apprentices may have assisted them. In Structures M8-8 and M7-35, however, such patterns are less clear, probably because of the residents' involvement in different kinds of work, including the carving of monuments in plazas. Some side rooms, particularly the south room of Structure M8-8 and the east room of Structure M7-35, which contained a relatively small number of objects, were probably used as living and sleeping spaces.

The west room of Structure M7-35, the north rooms of Structures M8-4 and M8-8, and the south room of Structure M8-10 contained numerous storage and cooking vessels, metates, and manos and most likely were used for food preparation and storage. These rooms tended to have high numbers of spindle whorls, bone tools for textile production, and figurines. Food preparation and textile production were closely associated with females, and these rooms were probably used mainly by women. Some of these side rooms also appear to have served as general storage spaces and contained shell and greenstone ornaments, polished axes and other lithics, and musical instruments. Some of these objects were probably used by male members of the household as well. The north and south additions of Structures M8-4, M8-8, and M8-10 lacked benches, and they were probably used as storage and work spaces. The area behind the structure, as well as other exterior areas, served as important work and storage areas. As demonstrated in the excavation of Cerén (Sheets 1992), a substantial part of the structure's exterior walls was probably covered by eaves. In the case of Structures M8-8 and M8-10, large metates were placed behind structures, and we may assume that they were used for food preparation mainly by females. The areas behind Structure M8-8 and south of Structure M8-4 were also used for manufacturing activity.

These data indicate that there were relatively clear divisions—but not strict segregation—of spaces associated with men and women. Similar spatial configurations may be found in other areas of Mesoamerica and in different time periods, including Formative Oaxaca (Flannery and Winter 1976) and modern Zinacantán (Vogt 1969:83–84). Probable residences of lower-status households show some similarities, but divisions of gendered spaces in these buildings appear less clear. In Structure M8-13, the west room was used primarily for food preparation and storage in a manner similar to some side rooms of the high elite residences, but the center room may have been used by both male and female residents. The function of Structures M8-2 and M8-3 is more difficult to evaluate, but they may have been occupied by one household of low-status servants or assistants for elite households, along with the nearby Structure M8-1. Structure M8-2 and the area in front of it were the primary food preparation area for this household, and Structure M8-3 was a space for living and craft work. If so, this pattern might be similar to those of the rural settlement of Cerén, where individual small structures served distinct functions, including domiciles, kitchens, storage structures, and workshops, and three or more of them were occupied by a single household mainly consisting of a nuclear family (Sheets 1992, 2002). In other words, each small building corresponds roughly with a single room of the elite residences in terms of its functions. Whereas the multiroom structures appear to have emphasized the centrality of the center room and the courtly interactions held there and directed toward an audience in the patio, the configurations of these small residences of lower-status households exhibit less concern for these activities.

An intriguing question is whether the left or right sides of multiroom buildings were associated with a specific gender or specialized function (see Emery and Aoyama 2007). Although clearer patterns may emerge when a larger number of structures are excavated, the currently available data do not appear to indicate any preference for specific sides or associated symbolism. If we focus on the function of food preparation and storage as the clearest element associated with females, it is found in the north rooms of Structures M8-4 and M8-8 and the west room of Structure M8-13 (the left side for a person sitting in the center room facing the entrance), but also in the south room of Structure M8-10 and the west room of Structure M7-35 (the right side). In Structure M7-34, the differential use of space is far less clear, and both side rooms appear to have been used mainly for food preparation. Patterns in gradually abandoned structures are more difficult to evaluate, but in Structure M7-32 the north rear room is connected with the center room, which was probably used as a throne room by the male ruler. Thus, the left side was probably used by a male. In Structure M6-29, a long structure located outside the Aguateca epicenter, soil chemistry analysis by Richard Terry (personal communication, 2006) shows a high phosphate concentration in the north portion of the building (the right side), suggesting food preparation in this area. Thus, female-associated rooms or areas are distributed roughly evenly. Moreover, the use of left and right sides may have been relatively flexible. In Structure M8-10, the south addition, equipped with a drainage hole, may have been originally used for food preparation along with the adjacent south room. When the midden next to it was nearly filled, this function may have been moved to the northern addition.

The excavation of the rapidly abandoned structures provided important data on the modes of refuse management. Three middens were identified in this area: a thick and dense midden south of Structure M8-10 and west of Structure M8-13 that flowed into the area behind the latter; a thin one northeast of Structure M8-10 and southwest of Structure M8-8; and a small but relatively dense one west of Structure M8-2. It is probable that these middens or nearby areas were also used as latrines. Instead of throwing garbage down into the escarpment that was only 20 to 30 m away from these buildings, most residents threw refuse right next to their residences. In the tropical climate, these middens containing animal remains and food refuse must have reeked. Because the Maya used exterior areas around their residences as storage and work spaces, they let trash accumulate right next to storage vessels. In the areas behind Structure M8-13 and Structure M8-2, the middens and the work/storage areas with usable objects almost merged together without clear divisions. The residents' only concern appears to have been to keep the patio areas relatively clean; a one-course-high stone wall prevented the midden south of Structure M8-10 from flowing into the patio. Otherwise, they showed little interest in keeping decaying garbage away from their living and working spaces. It is not clear whether they intentionally kept refuse for its later use in agricultural fields or construction fills, whether there were moral prohibitions discouraging throwing trash outside house lots, or whether they simply did not care. In any case, the result was a highly unhygienic condition.

Organization of Domestic Groups

Archaeologists have debated the occupancy pattern of multichambered structures in the Maya Lowlands. One hypothesis is that a household occupied a single room, and a structure accommodated multiple households; another is that an entire structure was used by a single household (see Becquelin and Michelet 1994; Tourtellot et al. 1990; Webster and Freter 1990). The data from Aguateca strongly favor the latter hypothesis, although there was probably a certain level of flexibility and variability between different elite households. Each of the rapidly abandoned elite residences at Aguateca exhibits clear functional complementarity between its rooms, usually organized around the center room. At the same time, different elite buildings show close redundancies in terms of the basic domestic necessities of living spaces, food preparation, and storage, but there are certain differences in specialized craft production and the level of material wealth. Similar configurations are found among lower-status groups, although in their cases individual small structures roughly correspond to the individual rooms of elite residences. In this regard, lower-status households may have enjoyed spaces similar to those of elite groups despite the lower quantity and quality of their material possessions.

The co-residential group that occupied each of the multiroomed structures constituted a relatively well defined economic unit, which may be called a household. The residents of Structures M7-35, M8-4, M8-8, M8-10, and M8-13 stored and prepared their food separately (Triadan 2000). In particular, Structures M8-10 and M8-13, which faced the same patio, exhibited a marked difference in the quantity of valuable goods, such as greenstone and shell ornaments. Each of these structures was also a place of craft production, including skilled scribal and artistic production and textile production. Similar organization can be found in lower-status groups that occupied groups of smaller structures, as in the cases of Structures M8-2 and M8-3 and those at Cerén. Moreover, each of the elite households was an important political unit. Their residences, particularly the center rooms and patios, were settings for courtly interactions with extra-household individuals.

Both the elite and non-elite households at Aguateca appear to have been composed typically of a nuclear family, although the makeup of their members certainly changed through time and varied among households. Because substantial areas of each residence were taken up by storage jars and other objects, the remaining living and sleeping spaces were relatively limited, suggesting that the households were of relatively small size. The probable division of male and female spaces is also consistent with household composition consisting of a conjugal pair and their children. Although the prevalence of patio groups has led many scholars to assume that a Classic Maya household consisted of an extended family or other types of large group (Tourtellot 1988; Willey 1981:389–391), these data from Aguateca point to the importance of smaller groups in daily life, economic activities, and material possessions. In addition, these observations lead me to suspect that commonly accepted population estimates in the Maya Lowlands based on the figures of 4 to 5.6 people per structure are too high. Data from both Aguateca and Cerén indicate that a significant amount of space within a residential structure group was used for functions other than sleeping and resting (see Culbert and Rice 1990).

Organizations beyond individual households are more difficult to evaluate. This is partly because in the Aguateca epicenter the structures built in the narrow areas between the Causeway and the escarpment do not form clear patio groups. Nevertheless, there must have been social groups and networks that nested or crosscut households. Structures M8-10 and M8-13, facing the same patio, probably formed such a group, and their residents may have belonged to the same extended family or other kin groups. Still, I should reiterate that they maintained separate food preparation and storage functions, and the difference in material possessions, particularly of shell and greenstone ornaments, is striking. Both Structures M8-10 and M8-13 contained evidence of bone working, and Emery (Chapter 9) notes that Structure M8-13 was more focused on the primary production of bone perforator blanks, which may have been passed to other locations for the final-stage production of bone artifacts. If so, the residents of Structure M8-13 may have cooperated with those of Structure M8-10 or other buildings in bone artifact production. Likewise, the matching of metates and manos suggests that the residents of Structures M8-2 and M8-3 helped those of Structure M8-4 in food preparation. The substantial difference in material possessions indicates that the occupants of Structures M8-2 and M8-3 were not members of the same kin group as those of Structure M8-4 but worked as servants or assistants of the latter.

A larger group, consisting of Structures M8-1, M8-2, M8-3, M8-4, M8-8, M8-10, M8-13, M8-6, and M8-5, may have functioned as a type of patio group. Aoyama refitted obsidian pieces from Structures M8-4 and M8-13 (Volume 2:Table 2.10), which may imply economic collaboration among the residents. In addition, the members of

Table 14.3. Total Weight of Ceramics by Structure.

Structure	Weight (g)
M7-22	970678
M7-32	434085
M7-34	303197
M7-91	42711
M7-92	72277
Subtotal	418185
M7-35	110494
M8-10	401053
M8-13	247374
M8-2	160274
M8-3	46715
Subtotal	206989
M8-4	385278
M8-8	374217

Note: Excludes ceramics that were found in fill, middens, or open areas away from structures.

this group may have formed a social unit tied to religious practices. It has been noted that many patio groups at various centers included shrine-like buildings (Becker 1971; Webster 1989). One of the unexcavated structures in this group may have served this function. In a residential group farther to the south along the Causeway, Structure M8-17, excavated during the Petexbatun Project, appears to have been a shrine (Inomata and Stiver 1998). It is probable that these groups tied to religious activities were based on real or fictive kin relations and cooperated in other matters, including landholding and political competition at the court (see McAnany 1995).

As a possible communal house, Structure M7-34 provides important information in this regard. The residents of Structure M8-4 may have played an important role in the management and sponsoring of activities that were carried out in Structure M7-34. It is probable that along the Causeway and in other areas there were more buildings of similar function that could have been under the control of other elite groups. These buildings possibly provided places for gatherings of large groups that included or cross-cut multiple households.

Artifact Use

Here we summarize our insights into the use of some artifacts gained from the Aguateca assemblages. A particularly notable point is the large amount of artifacts found in the rapidly abandoned buildings. Table 14.3 summarizes the total weight of ceramics associated with the occupation floors of the extensively excavated structures. We can see that the weights of ceramics associated with the elite residences—Structures M8-4, M8-8, and M8-10—are relatively similar. Because some of the surrounding areas of these buildings were not completely excavated, I would estimate that the total weight of ceramics stored in and around each of these residences ranged from 400 to 500 kg. The weight of those from Structure M7-35 is considerably smaller, which may suggest a somewhat different use of this building; it is possible that this building on the Causeway was a house of an appointed official rather than a normal household (Inomata and Stiver 1998). The quantities of ceramics associated with the lower-status elite residence of Structure M8-13, the possible communal house of Structure M7-35, and the probable low-status residential group of Structures M8-2 and M8-3 are smaller but still substantial. In addition, the buildings must have contained a considerable amount of objects and furniture made of perishable materials. Given these large quantities of objects owned by individual households, the emptiness of the gradually abandoned buildings is striking, and demands specific explanations. Although certain objects may have been left behind, the abandoning residents probably took a substantial quantity of their possessions with them to their new residences. Because the Maya lacked pack animals, they probably needed to make several trips between their old and new residences. If so, such moves may often have involved relatively short distances.

There is a remarkably good correlation between the distribution of storage and cooking vessels and that of grinding stones and edible botanical remains. Still, evidence on specific use of individual ceramic vessels remains ambiguous. We generally assume that large jars of Cambio Unslipped and Encanto Striated were used for the storage of food and liquids, but some medium-sized jars may have been used for cooking. Red-slipped jars of Tinaja Red and Pantano Impressed are usually of medium size, and are nearly identical in shape—with a narrow opening and a concave base—to water-carrying jars used by the modern Maya. In her study of vessel volumes, however, Tonoike (2001) has suggested that some of them are too large for water carrying and that those large versions were used only for liquid storage. Bowls with a thin red slip of Subin Red and Chaquiste Impressed may have been used for soaking maize and other food, cooking, storage, and serving. We assume that they were common cook-

Table 14.4. Sums of Ceramic Vessel Volumes (cm³).

Structure	Room	Total	Cambio/ Encanto jars	Tinaja/ Pantano jars	Subin/ Chaquiste bowls	Serving vessels
M7-22	Easternmost room	101559	1712	64569	32737	2541
M8-4	North addition	76714	20647	1395	44821	9851
	North room	742252	499491	46395	167507	28859
	Center room	14208		9399		4809
	South room	316432	279863	6604	14258	15707
	South side	100738	88517	8150		4071
	Subtotal	1250344	888518	71943	226586	63297
M8-8	North addition	301402	260634	22033	8028	10707
	North room	391134	303452	32384	46804	8494
	Center room	309864	256580	41210	2578	9496
	South room	35324	17310	15149		2865
	South addition	120006	85214	969	31428	2395
	South side	154783	38600	40761	75422	
	Back	161649	121455	34267		5927
	Subtotal	1474162	1083245	186773	164260	39884
M8-13	Center room	207264	85092	75928	24536	21708
	West room	186594	83988	95734	4591	2281
	East room	35311			30142	5169
	Behind	92897		60781	20896	11220
	Subtotal	522066	169080	232443	80165	40378
M8-2 & M8-3	M8-2	287138	122586	113456	42893	8203
	M8-3	147544	80738	27811	29880	9115
	Subtotal	434682	203324	141267	72773	17318
M7-34	North side	133039	81677	42700		8662
	North room	186360	145563	21281	19240	276
	Center room	84223	39928	6734	36100	1461
	South room	399811	330205	44935	22936	1735
	South side	1148				1148
	Front yard	119720	32664	52340	25069	9647
	Behind	1775				1775
	M7-91	181693	69983	62531	47504	1675
	M7-92	125840	93533	23149	1160	7998
	Causeway	297691	225186	61676	8061	2768
	Subtotal	1531300	1018739	315346	160070	37145

Note: Excludes incensarios, lids, miniatures, reused fragments, and ceramic drums. The capacities of the Tinaja/Pantano jars of Structure M8-2 may be elevated if those found behind this building had fallen from the Palace Group.

ing vessels, but we were not able to find direct evidence, mainly because the fire at the time of abandonment obliterated traces of soot and fire-clouding. It was also not clear whether flat vessels in the shape of comales were used as tortilla griddles. Smaller bowls and jars, as well as vases and plates, are generally considered to have been used for serving food, but some of them were probably used for craft activities, including being used as spinning bowls. The broad distribution of ceramic vessels in various contexts indicates that their use was relatively flexible and that vessels of the same shape could have been used for multiple purposes.

It is remarkable that nearly identical sets of ceramic vessels were used by households of different status, ranging from the royal family that occupied the Palace Group to the low-status servants or assistants of Structures M8-2 and M8-3, although there were notable differences in their total quantities. The high elite residences distinguish themselves by a small number of fine polychromes (some with glyphs) (e.g., Cat. 310353 and 310042) and additional incised/impressed motifs on Pantano Impressed jars (e.g., Cat. 310301, 310300, 310239, and 310429), as well as the greater presence of imported vessels, such as Chablekal Gray. In terms of vessel capacity, the high elite residences of Structures M8-4 and M8-8 possessed substantially larger total storage capacities than those of the lower-status residences of Structures M8-13, M8-2, and M8-3, with the differences mainly accounted for by large Cambio/Encanto jars (Table 14.4). Nonetheless, the capacities of the water-carrying Tinaja/Pantano jars of the lower-status residences were as large as, or even larger than, those of the high elite residences. Two factors may account for this pattern. First, those households may have consisted of similar numbers of individuals, which meant that similar amounts of water were consumed and needed to be brought in regardless of their status. Second, the lower-status households may have been more responsible for the arduous work of hauling water from the river.

Lithic tools, particularly obsidian blades, were broadly distributed across different contexts. As Aoyama's use-wear analysis in Volume 2 shows, the use of lithic tools was highly flexible, and objects of the same shape could be used in multiple ways. Aoyama notes that many individuals, including elite scribes and females, probably made certain lithic tools and resharpened them with additional knapping, although certain tool types were most likely produced by specialized artisans. One lithic type that shows specific distribution patterns is the polished ax. Many were probably used for skilled artistic production of carving, which contrasts to oval bifaces, which were used for a variety of purposes (Volume 2). Artifacts of special interest are small obsidian blade points and small chert points. Aoyama suggests that many were used as arrow points although some may have served as drills (Volume 2:120–122). Each household had two to four of those points, and they were scattered across different rooms and areas. This distribution pattern is puzzling. If they were used as arrow points, we would expect to find a larger number of them in fewer concentrations because, to use them as effective weapons, warriors would have needed to carry multiple arrows and to practice using them frequently. One explanation for this pattern is that the residents used most of the arrows stored in their houses for the final battle. The number of small points found in other contexts at Aguateca and at other Maya centers, however, appears too small. Another possibility is that some of these points may have been left by the invading enemies during the battle.

As seen in the north room of Structure M8-4, the north room of Structure M8-8, and the south room of Structure M8-10, spindle whorls and pointed or elongated bone tools show close association with the areas for food preparation and storage. As noted above, these patterns most likely indicate that food preparation and textile production were carried out primarily by females (Hendon 1997; Joyce 1993). This distribution pattern is less clear in Structures M8-13, M8-2, and M8-3, which I suspect resulted not from the use of these objects by males but from the less strict division of gendered spaces in lower-status residences. Although some spindle whorls may have been used as flywheels for drills, these distribution patterns lead me to think that the majority of them were used for spinning. Some perforated sherds may have been used for the same purposes, but many of them do not have completely round shapes or holes in the center, so I believe they were used for other activities. We should also note that some of the pointed bone tools were probably used for purposes other than textile production, including hide work, basket making, and removing maize grains. Some of these objects found in Structure M8-8 may have been used for hide work, and it is not clear whether this work was carried out by males or females. Figurines also tend to show distributions similar to those of spindle whorls and pointed bone tools. These artifacts may have been used by various household members, but females and children appear to have been particularly important users (Triadan 2007; Chapter 2). The presence of figurine molds in Structures M8-4 and M7-35 suggests that figurines were made in these buildings, probably by females. Large worked sherds with clay residues found in those buildings may have been used for figurine production.

The function of doughnut stones has long been a vexing problem. The data from Aguateca do not solve this question but provide important clues. The stones' distribution shows a close correlation with that of manos, as in the area in front of the north room of Structure M8-8, the area behind Structure M8-13, and the area near the southwestern corner of Structure M8-2. In particular, the three doughnut stones placed with nine manos in the north room of Structure M8-4 suggest that these objects were related to activities involving food processing or the grinding of other materials. One possibility is that they were used as perforated mortars, as suggested at Cerén by Sheets (1992:96). In addition, Tomasic (2012) points out that these distribution patterns indicate close associations between doughnut stones and spindle whorls, and some of the doughnut stones were used for thigh-supported spinning of fiber. These perforated stones were most likely used for multiple purposes.

Another artifact type of interest is the bark beater, which is usually believed to have been used for the production of bark paper. In the assemblages of the rapidly abandoned structures excavated during the Aguateca Project, only two were found, both associated with Structure M8-8: in the north addition and in the area behind the structure. It is interesting to note that Structure M8-4, with strong evidence of scribal work, did not contain any bark beaters. In the structures excavated during the Petexbatun Project, these objects were not found in the same areas as stone palettes and pestles: one in the center room of Structure M7-35 and one in front of the south room of Structure M8-10 (Inomata 1995). Paper making may have been carried out not by scribes but by other individuals. McAnany and Plank (2001) note that bark beaters were present as early as the Middle Preclassic period and were also found in non-elite residences, which implies that they were not always intended for scribal work but were also used for the processing of bark for clothing and other uses. The bark beaters found in Structure M8-8 may have been used in such ways. It appears that in those areas bark cloth production took place along with hide processing.

chapter

15

Conclusions

Takeshi Inomata

HISTORY OF AGUATECA

The first phase of the Aguateca Archaeological Project originally focused on the Late Classic period, but the excavation of the Barranca Escondida has provided important information on Aguateca's early history. It is useful to summarize the history of Aguateca by integrating the data from the second phase of the Aguateca Project (Inomata et al. 2009, 2012) and the Aguateca Restoration Project.

Preclassic Period (300 BC–AD 250)

The earliest archaeological evidence of occupation at Aguateca dates to the Late Preclassic Faisán phase (around 300 BC or later). A small population may have lived at Aguateca or visited the place during the Middle Preclassic period or earlier, as pollen data obtained in lake cores show earlier traces of deforestation (Dunning et al. 1997). In addition, Middle Preclassic settlements have been found at Ceibal, on the Pasión River, dating to around 1000 BC (Sabloff 1975; Inomata 2011; Inomata, Triadan, and Román 2010), and at Punta de Chimino, located on the peninsula in Lake Petexbatun, probably starting around 800 BC (Bachand 2006) (Figure 15.1). Investigators of the Petexbatun Project have identified the small settlement of Bayak, dating to the late Middle Preclassic period, near the Petexbatun River (Foias 1996:207). It appears that the early sedentary population that used ceramics in the Pasión region first emerged along the major river and gradually expanded to its small tributaries and other areas (Willey 1977). In the Petexbatun region, the Middle Preclassic settlements were first established on low ground near the river, and during the Late Preclassic period the demographic foci shifted to the areas above the escarpment. I should note that the settlement of Dos Ceibas, located to the south of Aguateca and investigated by Eberl during the second phase of the Aguateca Project, may have started during the Middle Preclassic, but evidence remains ambiguous (Eberl 2007; Eberl, Triadan, and Inomata 2009).

The Preclassic occupation at Aguateca was centered in the Guacamaya Group in the western part of the site, which was investigated during the Petexbatun Regional Archaeological Project (Inomata 2007b). The Aguateca Archaeological Project First Phase did not reveal any additional Preclassic buildings, and the amount of ceramics dating to this period was extremely small (Volume 1:Table 7.1). The areas around the Palace Group, the Causeway, and the Main Plaza appear to have been sparsely occupied during the Preclassic period. The Late Preclassic period witnessed the growth of population and larger communities, but settlements seem to have been limited to the areas near the Petexbatun River, including Aguateca, Dos Ceibas, and Punta de Chimino. Investigations by the Petexbatun Project uncovered only a small amount of Late Preclassic ceramics at Dos Pilas, located away from the river (Foias 1996).

Early Classic Period (AD 250–600)

Except for the ritual locus of the Barranca Escondida, evidence of Early Classic occupation at Aguateca is extremely scarce. Aguateca was probably abandoned at the end of the Late Preclassic period, around AD 200. The ceramic chronology during the transition from the Preclassic to the Classic has been a vexing problem in Maya archaeology (Brady et al. 1998), but Early Classic settlements corresponding to the Tzakol 1 and 2 phases have been confirmed at Ceibal and Punta de Chimino (Sabloff 1975; Inomata 2011; Bachand 2006). The absence at Aguateca of Tzakol 1 and early Tzakol 2 utilitarian ceramic types, such as San Martin Variegated Brown and Caribal Red, indicates that the area was virtually deserted during this period. The end of the Preclassic period was a time of major social upheaval

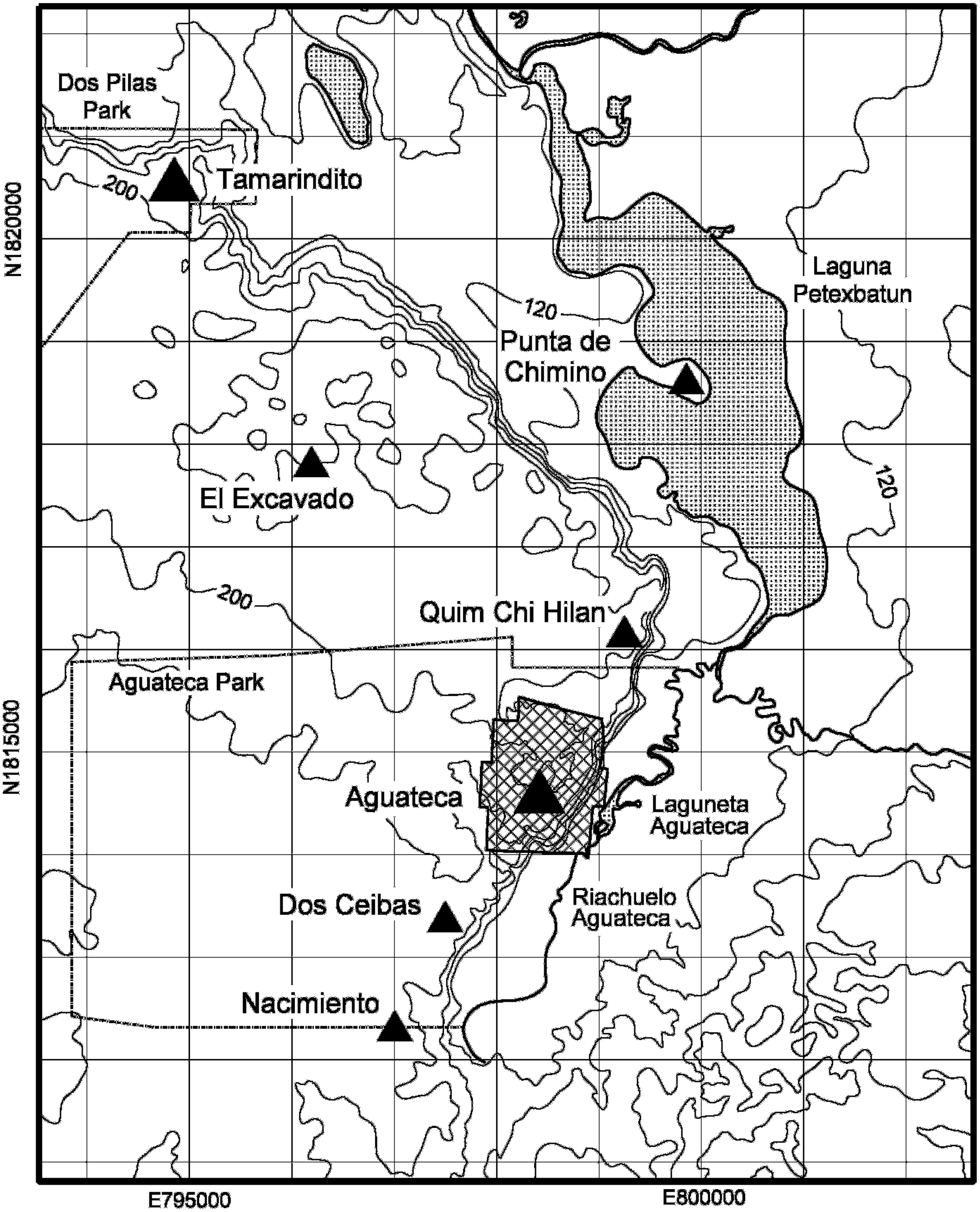


FIGURE 15.1. Map of the area around Aguateca, indicating the area mapped during the Petexbatun Regional Archaeological Project. 1-km UTM grid and 20-m contour intervals.

when numerous centers, including El Mirador, collapsed. The small community of Aguateca did not escape this turmoil.

In this demographic and political vacuum, a new dynasty based on the twin capitals of Tamarindito and Arroyo de Piedra emerged to dominate the Petexbatun region (Escobedo Ayala 2006; Houston 1993). The apparent absence of San Martin Variegated Brown and Caribal Red at Tamarindito and Arroyo de Piedra, as well as the dates of carved monuments, suggests that the growth of these centers dates to the late part of the Jordán phase, after AD 400 or 450, corresponding to the late Tzakol 2 and Tzakol 3 (Foias 1996; Bachand 2010). At Ceibal, the Hieroglyphic Stairway carved in the eighth century mentions an early ruler who reigned around AD 415 (Graham 1990), but the center appears to have been deserted in the mid-fifth century (Sabloff 1975; Inomata 2011). Punta de Chimino was abandoned around the same time, pointing to political conflicts surrounding the rise of the Tamarindito dynasty. These changes may have been affected by the expansion of the political power centered at Tikal, which attempted to control the trade routes along the Pasión River (Bachand 2010; Woodfill 2007; Woodfill and Andrieu 2012).

The use of the Barranca Escondida as a ritual location probably began toward the end of the Early Classic period during the sixth century. The placement of monuments in this area of difficult access is an anomaly in Classic Maya practices, and the interpretation of this area is difficult. We have considered two hypotheses: (1) the monuments were originally erected in other locations and were later moved to the Barranca Escondida, and (2) the monuments were erected at the Barranca Escondida originally. I am inclined to favor the latter hypothesis, mainly on the basis of archaeological evidence (see Volume 1:148 for detailed discussion), whereas Houston prefers the former (Chapter 12). This issue needs to be further examined. Either way, the Barranca Escondida and the area of Aguateca were probably part of the sphere of influence or the territory of the Tamarindito–Arroyo de Piedra dynasty. The presence of cave-like chasms probably gave symbolic value to the Barranca Escondida and the area of Aguateca. The ritual nature of this location is also indicated by the presence of numerous intentionally broken greenstone ornaments and the probable butchered remains of an adult jaguar individual identified by Emery (Chapters 8 and 9). If Stelae 15, 16, and 17 were placed there originally by the Tamarindito dynasty, they may have served to mark a broader ritual and political landscape of the dynasty, in a way comparable to Copan Stelae 10 and 12, which are located outside the Copan center.

A small quantity of Early Classic ceramics, possibly dating to the late facet, was found in the fill of Structure K6-1 of the Guacamaya Group and Group M6-3, which suggests that a small population gradually grew at Aguateca during the sixth century. To the south of Aguateca, the excavation of Dos Ceibas by Eberl during the second phase revealed a modest amount of Early Classic Jordán ceramics, although he did not find evidence of construction dating to this period (Eberl 2007:367–368). It is possible that these materials reflect the reoccupation of this village toward the end of the Early Classic.

Early Facet of the Late Classic Period (AD 600–720)

During the early facet of the Late Classic Nacimiento phase (AD 600–720), corresponding to Tepeu 1, the political landscape of the Petexbatun region was transformed by the foundation of Dos Pilas. Probably in the decades of AD 630 or 640, Bahj-laj Chan K'awiil, who originated from the royal family of Tikal, settled in this location at the extreme edge of the Petexbatun horst, which was away from the river and had been sparsely occupied previously (Fahsen 2003; Guenter 2003; Martin and Grube 2008). It is probable that Dos Pilas was founded with the agreement of the Tamarindito dynasty, but we can imagine that tension between the local groups and the new migrants was unavoidable.

During this period, modest populations grew at Aguateca, Dos Ceibas, Nacimiento, and probably Punta de Chimino. Triadan's excavation of Group M6-3, located outside the Aguateca epicenter, during the second phase of the Aguateca Project has documented that the occupation of this group started during this period, if not earlier (Triadan et al. 2009). The Early Nacimiento settlements at Aguateca appear to have been largely limited to its northwestern part, and the excavation of the Main Plaza and the Palace Group during the first and second phases of the Aguateca Project recovered only a few materials dating to this period. This small community of Aguateca was probably under the direct control of, or in close affiliation with, the Tamarindito dynasty. The Barranca Escondida continued to be used as a ritual locus, and a substantial quantity of Early Nacimiento ceramics was deposited, presumably by the Tamarindito elite. Stela 16 might have been erected there during this period. There may also be epigraphic evidence suggesting that Aguateca was originally part of the Tamarindito–Arroyo de Piedra polity. Buechler (2012:529–536) points out that the main sign of the Tamarindito–Arroyo de Piedra Emblem Glyph, the so-called Foliated Scroll glyph, may refer to the entire Petexbatun horst. One of the examples indicating this meaning is a phrase from Aguateca Stela 1 showing the Aguateca toponym followed by the Foliated Scroll glyph (*K'inich Pa'witz ti* <Foliated Scroll>, 'Aguateca' in 'Foliated Scroll'). This usage implies, Buechler argues, that the original rule of the Tamarindito–Arroyo de Piedra dynasty extended throughout the Petexbatun region, including Aguateca.

The population in the peripheries of Aguateca gradually grew during this period, as shown by excavations at Dos Ceibas and Nacimiento by Eberl (2007) and in the north transect between Aguateca and Tamarindito by Buechler (2012) during the second phase of the Aguateca Project. The occupation of the small settlement of Quim Chi Hilan, located to the north of Aguateca, also began during this period; the excavations by Van Tuerenhout (1996) during the Petexbatun Project revealed burials with Early Nacimiento ceramics.

Dos Pilas was defeated by Calakmul, probably in AD 650, and Bajlaj Chan K'awiil was apparently exiled to Aguateca (Martin and Grube 2008; Guenter 2003; see also Chapter 12). It is curious that the defeated king fled to this small community rather than seeking protection at the center of Tamarindito. This episode may imply a delicate relation between the two dynasties, or it may be that Aguateca was already in the political sphere of Dos Pilas before the battle. Either way, this stay of the first Dos Pilas ruler foretold the foundation of a new center in this place several decades later.

Middle Facet of the Late Classic Period (AD 720–761)

During the middle facet of the Late Classic Nacimiento phase (AD 720–761), Aguateca transformed into the twin capital of Dos Pilas. Stela 3, dedicated by the Dos Pilas Ruler 3 in AD 731, is the first known monument that was erected by the Dos Pilas dynasty in the Main Plaza. Stela 15 of Dos Pilas, however, states that Ruler 2, Itzamnaaj K'awiil, erected a monument in AD 721, possibly at Aguateca (Houston 1993:110). It remains to be determined whether this refers to Stela 18 found in the Barranca Escondida, but Houston feels that this monument dates to a later period (Chapter 12). Itzamnaaj K'awiil was an overlord of the Tamarindito dynasty (Houston 1993:114), and the Dos Pilas dynasty may have claimed Aguateca as part of its kingdom during his reign. It was probably around the time of the erection of Stela 3 in AD 731 that the Main Plaza, the Palace Group, and the area along the Causeway were rapidly constructed. Excavations during the second phase revealed only one construction stage in the Main Plaza, the patio of the Palace Group, the basal platform of Structure M7-22, and rooms of Structures M8-3, M8-8, and M8-10. Only the excavation of Structure M8-4 revealed a partially dismantled earlier building (Inomata et al. 2009). The construction boom was not limited to the epicenter. Numerous structures were built in other parts of Aguateca (Inomata 2007a; Inomata et al. 2009), rapidly transforming it into a densely occupied political center.

The rapid population growth cannot be accounted for by natural population growth alone. Some of the migrants were probably the retinue and subjects of the new dynasty. In addition, a substantial non-elite population may have moved into this new center, attracted to its rising power and fortune (Inomata 2004). However, I should add that many elites most likely kept dual residences at Dos Pilas and Aguateca, with the former still being the primary base until its probable abandonment in AD 761. Extensive excavations during the first and second phases below the room floors and benches of Structures M8-3, M8-8, and M8-13, as well as the front part of the basal platform of Structure M7-22, did not reveal any burials. Only Structure M8-10 contained one adult burial in the center room, one possible infant interment in the south room, and a burial with two bodies in the area behind the structure, in addition to a burial in the area in front of Structure M8-2 and an empty crypt in Structure M8-4 that may have contained an infant in the center room (Inomata 2007a; Ponciano, Pinto et al. 2009; Ponciano 2009). The low density of burials in the epicenter of Aguateca makes a clear contrast to Group M6-3, which was continuously occupied since the Early Nacimiento phase and where the excavation of Structure M6-29 alone revealed twelve burials (Triadan et al. 2009). I suspect that most elites began to bury their family members at Aguateca only after they started to live there on a permanent basis after the fall of Dos Pilas.

Ritual activities at the Barranca Escondida ceased at some point during the Middle Nacimiento phase. Excavators recovered a substantial amount of Middle Nacimiento ceramics there, but materials of the late facet were nearly absent (Volume 1:Table 7.1). Eberl has documented a structure made of cut blocks on the natural knoll behind Stelae 15, 16, and 17; the structure was severely vandalized in antiquity (Volume 1). This destruction may have been perpetrated at the same time as the face of the Tamarindito ruler depicted on Stela 16 was mutilated. Although we do not have specific data to narrow down the date, I am inclined to think that these acts of destruction were committed when Aguateca was taken over by the Dos Pilas dynasty around AD 730. In other words, the use of the Barranca Escondida essentially ended when the Main Plaza was constructed by the intrusive dynasty as a new focus of ritual activity. In addition, investigations by Ishihara (2007, 2008) during the second phase have shown that the ritual use of the Grieta (the largest fissure that is parallel to the Causeway) intensified after the takeover of Aguateca. There might be a parallel pattern of destruction at Tamarindito. Escobedo Ayala (1997) has noted that early stelae at Tamarindito (Stela 5) and Arroyo de Piedra (Stela 6) were intentionally damaged in antiquity and has suggested that the Dos Pilas dynasty subordinated Tamarindito through violent acts. I should add that the original residents of Aguateca were allowed, or encouraged, to stay in this center, as can be seen in the continuous occupation of Group M6-3. The Guacamaya Group, the focus of communal life of this local population, was overshadowed by the newly built Main Plaza but unlike the Barranca Escondida did not suffer destruction. The new dynasty probably tried to integrate the earlier residents into its polity through persuasion rather than coercion.

Surveys in the peripheries of Aguateca during the Petexbatun Project and the second phase of the Aguateca Project have shown that the rural population also increased during this period (Buechler 2012; Eberl 2007; Van Tuerenhout 1996; Inomata et al. 2009; Demarest et al. 1997). I recognize two types of architectural style among medium-sized to large residential buildings at Aguateca and in the peripheries: the local Pasión and the intrusive Aguateca styles (Inomata 1995:465–482). Pasión-style structures are characterized by horizontally placed rough blocks, a lack of room divisions, and a low bench. Aguateca-style buildings, in contrast, typically consist of three rooms with high benches, are separated by room divisions, and are made of cut blocks or vertically placed slabs. Investigations in Aguateca Group M6-3 by Triadan and in the north and south survey transects by Buechler (2009, 2012) and by Eberl (2007, 2009) generally confirmed my original assumption that some of the Pasión-style buildings were constructed during the Early Nacimiento phase, thus representing the original architectural mode of this area. The Aguateca-style structures were built during the Middle Nacimiento phase at Aguateca and Dos Ceibas, but the residents in most parts of the north and south transects and Tamarindito continued to construct structures in the Pasión style. The Aguateca style is also found at Dos Pilas and resembles structures in central Peten, and thus the Dos Pilas dynasty and the accompanying population appear to have favored this style.

Nevertheless, this division between the two styles should not be taken too strictly or exclusively because the royal family and other high elites at Tamarindito and other places lived in multiroomed residences built with cut stones during the Early Classic period and the Early Nacimiento phase (Valdés 1997), and many small structures associated with Aguateca-style buildings at Aguateca are indistinguishable from the Pasión style. Still, the distribution of Aguateca-style buildings may reflect the area that the Dos Pilas–Aguateca dynasty directly controlled. It is intriguing that the density of structures was low just outside this area, that is, between Aguateca and Quim Chi Hilan to the north and between Dos Ceibas and Nacimiento to the south. These low-density areas might represent political buffer zones between the Aguateca polity and the Tamarindito-affiliated communities, although it is equally possible that this distribution is simply due to these areas' ragged topography and numerous sinkholes.

The pattern at Dos Ceibas is particularly suggestive. As discussed above, the primary stage of public ceremonies in this community during the Preclassic period and the Early Nacimiento phase was the North Plaza. During the Middle Nacimiento phase, however, the focus of communal ritual shifted to the newly built South Plaza, with its main building, Structure R27-83, constructed essentially in one episode in the typical Aguateca style (Eberl 2007:346–357; Eberl et al. 2009). It is probable that the Dos Pilas–Aguateca dynasty attempted to control this community directly by placing its administrator there and expressed its rule through the establishment of a new ceremonial-administrative space. This strategy closely parallels the one adopted for Aguateca that replaced the older ritual loci of the Guacamaya Group and the Barranca Escondida with the Main Plaza and the Grieta. The foundation of a new capital by the intrusive dynasty involved not only the development of new political institutions but also the creation of new senses of place and new experiences of collective activities among the old and new residents.

Outside Aguateca and Dos Ceibas, some large residential buildings at Nacimiento and in the southern part of the north transect combined the construction technique of the Pasión style with some elements of the Aguateca style, such as the three-room arrangement with room divisions. It appears that the local residents voluntarily and selectively adopted certain architectural elements of the intrusive dynasty (Buechler 2012:485–486). These new spatial arrangements may also have implied different protocols of interaction in local gatherings and on other occasions. These communities appear to have maintained some level of autonomy or affiliation with the Tamarindito dynasty. If the Dos Pilas–Aguateca dynasty attempted to integrate these villages into its political order, the effects must have been far less direct than in the case of Dos Ceibas. If so, the sphere of direct control of local populations by the intrusive dynasty remained fairly small with a north-south extension of roughly 4 km from Quim Chi Hilan to Dos Ceibas (Buechler 2012:Figure 150). This contrasts with the far-reaching pattern of inter-elite interactions, involving the distant centers of Cancuen, Itzan, Calakmul, and Naranjo.

Late Facet of the Late Classic Period (AD 761–810)

Possibly as a result of a military defeat, Dos Pilas was abandoned by the elite in or slightly after AD 761 (Houston 1993; Demarest et al. 1997). The ultimate fate of Ruler 4, K'awiil Chan K'inich, has been debated, but reevaluation of Aguateca Stela 6 has led Houston to suggest that this ruler stayed at Aguateca until his death in AD 769 (Chapter 12). Aguateca was now the sole capital of this dynasty. Along with the royal family, its court probably moved to this center, and the Palace Group, the residences along the Causeway, and other buildings became their permanent homes.

The next ruler, Tahn Te' K'inich, tried to revive the dynasty and its center. He began to dedicate large stelae at Aguateca, unlike the ones his predecessors erected there, which were substantially smaller than those placed at the primary center of Dos Pilas (Houston 1993). He was probably responsible for the construction of new temples, Structures L8-6 and L8-7, associated with his stelae. The regional hegemony of the dynasty was seriously compromised, although Tahn Te' K'inich appears to have maintained some sort of prestige or power over other centers in the Pasión region, including Ceibal and La Amelia (Houston 1993) (Chapter 12). This trend toward political fragmentation may have led to the intensification of warfare (Demarest 1997), and the Aguateca elite felt threatened enough to build a series of defensive walls.

My colleagues and I have suggested that the final attack on Aguateca occurred around AD 810 (Inomata et al. 2004). We do not have direct data to pinpoint the date of wall construction, but various lines of circumstantial evidence lead me to suspect that the final down-spiral of this center, from the construction of defensive walls to abandonment, happened within a matter of a few years at the most, for the following reasons. First, the elite residences along the Causeway maintained the traditional courtly way of life, including scribal work, until the end. This implies that the serious deterioration of the political situation and the final fall happened within a short time span. Second, the excavation of Structure L8-8 on the western side of the Main Plaza has shown that the construction of this large temple, along with the carving of the associated Altar M, was suspended and then the defensive walls that abutted this building were constructed (Inomata et al. 2004). Third, the expedient construction of stone walls and probable palisades could likely have been done within a few months or a substantially shorter period, depending on the availability of labor (see Buechler 2012:537–542). The outer wall ends abruptly in a flat area in the northwestern part of Aguateca, and it may not have been complete. If so, Aguateca may have been attacked while the residents were still constructing the defensive system.

I have noted that the center of the roughly concentric pattern of defensive walls was the Palace Group, and the construction of the walls may have started while the dynasty, and probably Tahn Te' K'inich, was still in power (Inomata 1997). As part of the defensive system, the residents built small walls around Structures M7-22 and M7-32 in the Palace Group, as well as Structures M8-4, M8-11, and M8-34 along the Causeway (Inomata 2007a; Valdés et al. 1999; Ponciano et al. 2004). Some of those walls blocked a substantial part of the wide frontal stairways, which indicates that the walls were not part of the original architectural designs. Their function was most likely the defense of these royal and elite buildings. The excavation of Structures M7-22 and M7-32 showed that these buildings were nearly emptied and some royal possessions were stored in the sealed easternmost room of Structure M7-22 (Volume 1). I have suggested that Tahn Te' K'inich and the royal family left Aguateca before the final attack while many courtiers remained in the center (Inomata 2003). The excavation of the basal platform of Structure M7-32 during the Aguateca Restoration Project Second Phase revealed that many blocks of its frontal stairway were dismantled, which may have happened after the departure of the royal family. Still, compared with Dos Pilas, where many structures were robbed of stones for the construction of defensive walls, damage to the existing buildings at Aguateca was limited.

Defensive walls dating to the end of the Late Classic period are unusual in the southern Maya Lowlands, and roughly contemporaneous or somewhat later walls have been found mainly in the northern lowlands (Dahlin 2000; Webster 1979). However, recent extensive reconnaissance by Golden and Scherer has revealed similar walls in the area between Yaxchilan and Piedras Negras (Scherer and Golden 2009; Golden et al. 2008). Like the walls of Aguateca, these walls in the Usumacinta region were probably built under the command of the elite power. More investigations specifically geared toward the issue of warfare may reveal similar features in other areas.

An important question regarding this process is the abandonment of rural settlements. Excavations in the Aguateca peripheries by Eberl and Buechler recovered few ceramics that could be securely dated to the Late Nacimiento phase (Inomata et al. 2009). The most diagnostic type of the late facet is imported Chablekal Gray (Foias 1996:428–431). Few sherds of this type and other unspecified Fine Gray were found: three in the north transect (0.05 percent of the total excavated ceramics), none at Cerro de Cheyo and Nacimiento, and six (0.2 percent) at Dos Ceibas (four of them from Group MP1, located at the northern end of the site, and one from Structure R27-83 in the South Plaza) (Buechler 2012:332; Eberl 2007:232, 303–363). These data have led Eberl (2007:371) to suggest that those rural settlements were abandoned soon after AD 761, when the residents possibly moved to the better-defended area of Aguateca.

I feel that we need to evaluate problems involved in the ceramic chronology carefully before we reach any specific conclusions. It is necessary to consider the possibility that the distribution of Chablekal Gray, likely imported from the middle Usumacinta region (Foias and Bishop 1997), reflects not only temporal differences but also socio-economic organization. These sherds are most abundant in the elite residential area along the Causeway of Aguateca (*n* = 1,055, 0.9 percent; data from the First Phase). The quantity in other parts of Aguateca is substantially lower (*n* = 25, 0.2 percent; data from the Petexbatun Project) and is comparable to that from Arroyo de Piedra (0.3 percent; Foias 1996:430 [a considerable portion of the materials is from a dense elite midden]). The amounts from Dos Pilas and Tamarindito collected during the Petexbatun Project (0.07 percent; Foias 1996:430) are roughly comparable to those from the north and south transects of the Aguateca Project. Moreover, the extensive excavations at Ceibal, which has monuments dating to AD 800, failed to recover ceramics that can be unequivocally identified as Chablekal Gray. These data suggest that the distribution of this imported ware was significantly affected by differences in socio-political status and that different communities within the Pasión region did not share the same trade network. Even elite members of certain communities, such as Ceibal, may not have had access to, or preference for, Chablekal Fine Gray.

As discussed above, I suspect that the defensive walls at Aguateca were possibly constructed toward the end of the Late Nacimiento phase. Outside Aguateca, the walls at Quim Chi Hilan and Cerro de Cheyo were most likely constructed at the same time period as those of Aguateca, functioning as parts of the same defensive system (Inomata 2007a). If so, the apparent absence of Chablekal Gray at these defended sites (Eberl 2007; Foias 1997:587–610) may have resulted from social factors rather than a temporal difference from Aguateca. The same explanation may apply to sites with stone walls in the area between Aguateca and Tamarindito that lack this trade ware, including Nim Li Naj and La Estela (Demarest et al. 1997; Buechler 2009, 2012).

Through a superb analysis of the walls found outside Aguateca and a comparison with historical and ethnographic cases, Buechler (2012:490–513; see also Van Tuerenhout 1996:159–160) argues that they most likely served as temporary refuges for rural populations in times of attack. He estimates the numbers of individuals necessary for the defense of these fortifications' perimeters, and suggests that each of the walled areas was meant for a population larger than that of the immediate vicinity. In other words, a substantial part of the residential structures found outside Aguateca were probably occupied when those walls were constructed toward the end of the Nacimiento phase.

Eberl (2007:371) also notes that the absence of Mexican obsidian at Nacimiento and Dos Ceibas points to the early abandonment of these sites. This argument is most likely untenable. Aoyama (2007b:278, 2009:15) is explicit that in the Petexbatun region obsidian from Mexican sources, including Pachuca and Zaragoza, dates to the Early Classic and Terminal Classic periods. A handful of Mexican obsidian recovered in the Main Plaza and in the north transect possibly dates around the time of Aguateca's abandonment or slightly later. Most important, no Mexican obsidian was recovered in the excavation of the Aguateca Causeway area and the Palace Group dating to the Late Nacimiento phase (Volume 2:Table 2.2). Thus, the absence of Mexican obsidian in rural sites does not necessarily mean their abandonment earlier than the Aguateca epicenter.

Foias (1996:615–625) has identified volcanic ash-tempered brown ware, including Andres Red and Matu Incised, as another marker of the Late Nacimiento phase. These ceramics are present at Nacimiento (1.1 percent of all ceramics; 2.0 percent of Tepeu 2 ceramics at Structure M4-3) (Eberl 2007:463–464), in the north transect of the Aguateca Project (0.8 percent, all from the site of Chechén; Buechler 2012:254), and in the survey transect 2 of the Petexbatun Project (Foias 1996:615). These amounts are indeed larger than those from the Causeway area of Aguateca (0.2 percent), and they may reflect the continuation of occupation in these rural areas during the late facet of the Nacimiento phase.

The foregoing review of data shows that there is not sufficient evidence to claim that the abandonment of rural settlements was substantially earlier than that of the Aguateca epicenter; certain lines of circumstantial evidence rather appear to favor the interpretation that many of the rural settlements continued to be occupied during much of the Late Nacimiento phase. Still, we need to recognize that our current ceramic chronology is not adequate to resolve this problem satisfactorily. This issue needs to be further examined with more data.

The Abandonment of Aguateca (ca. AD 810)

The 9 Ajaw glyphs carved on the unfinished monument Altar M, placed in front of the unfinished temple L8-8, probably date the final attack on Aguateca fairly accurately to AD 810 (Inomata et al. 2004). The fall of Aguateca was swift. Many elite residences along the Causeway were probably burned during the final attack. Thermal alterations evident on numerous artifacts, including calcined bones, shell in gray colors, burned ceramics, chert objects with pot-lid fractures, obsidian with surface crazing, and limestone blocks cracked through decarbonation processes, indicate that the fire reached temperatures around 800°C in most cases (Inomata n.d.). This is the level of heat commonly attained in the burning of modern houses with wood frames. In the Aguateca structures, a substantial amount of fuel was probably present in the form of thatched roofs, wooden posts and beams, and furniture made of organic materials.

The invaders conducted termination rituals at Structures M7-22 and M7-32 in the Palace Group and at Structures L8-6 and L8-7 in the Main Plaza, destroying buildings and depositing a large quantity of broken objects (Inomata et al. 2001; Ponciano, Inomata et al. 2009). Dense deposits were not found in other buildings in the Palace Group and the Main Plaza, however (Valdés et al. 1999; Ponciano et al. 2004). It is probable that the enemies specifically targeted the buildings associated with the last ruler of Aguateca, Tahn Te' K'inich. Whereas Structures M7-22 and M7-32 were the main living quarters of the king and his family, the other buildings of the Palace Group appear to have been for administration and meetings. Likewise, while Structures L8-6 and L8-7 were associated with the stelae of Tahn Te' K'inich and were probably commissioned by him, the other buildings in the Main Plaza, except for Structure L8-8, were most likely built by his predecessors.

The project members have debated where the enemies obtained the contents of the termination deposits. Although this problem needs to be examined further, the majority of the material appears to have been produced and used at Aguateca before deposition. In particular, the refitting of the figurine pieces found in Structures M7-32 and M8-4 identified by Triadan (Triadan 2007; Chapter 2; Volume 1:52), as well as that of a chert point and a bifacial thinning flake west of Structure M7-22 and the area behind Structure M8-2 by Aoyama (Volume 2:Table 3.6), clearly demonstrates that some contents of the termination deposits originated from the epicenter of Aguateca. We have spent a substantial amount of time trying to refit ceramic sherds from these deposits and have confirmed that the majority were not reconstructible, although some ceramic vessels appear to have been deposited as complete or nearly complete pieces. Most of the materials were comparable to those from regular middens. A comparable secondary deposit placed at the time of building termination has also been reported from Blue Creek (Clayton et al. 2005). An intriguing piece of information concerns large Pacific olive shells that were in the process of production and were found in the termination deposits of Structure M7-32 (Chapters 8 and 9, Figures 8.12a and 8.17a, b). Aoyama, however, found little evidence of shell or bone working in the use-wear analysis of lithic artifacts from the Palace Group (Volume 2:55–74). This possible discrepancy may imply that the termination deposit materials were brought from multiple locations. Shell and bone working were common activities in the residences along the Causeway and are particularly well reflected in lithic use-wear and debitage in Structures M8-4, M8-10, and M8-13. The invaders may have taken some of the termination deposit materials from the middens associated with these elite residences, but a large portion of the palace deposits probably originated from locations not associated with bone and shell working.

Despite the certain similarities to common domestic refuse, the Aguateca Palace deposits exhibit important differences as well. The most notable is the presence of numerous ornaments made of greenstone and shell. Many greenstone ornaments were complete, making a contrast with the high breakage rate in the greenstone pieces found in the Barranca Escondida. Still, some greenstone objects found in the Palace deposits appear to have been intentionally destroyed. These precious items were probably added to the materials taken from domestic or feasting refuse during the termination ritual. In addition, the deposits found in Structure M7-32 contained human skeletal remains. The Palace deposits are also unique in that they appear to have been burned on the spot when Structures M7-22 and M7-32 were set on fire. A substantial amount of fuel added to these remains probably caused the fire to reach a high temperature. The large fire perhaps served to seal the physical and spiritual victory over the once powerful center.

Lives at the Maya Royal Court

The findings at Aguateca accord with the view that the Maya royal court functioned as the household of the ruler. In this organization the administration of the polity was an extension of the management of the royal household (Inomata and Houston 2001b; Sanders and Webster 1988). The epicenter of Aguateca consisted largely of residences and associated structures (Structures M7-22, M7-32, M8-2, M8-3, M8-4, M8-8, M8-10, and M8-13), along with some buildings for larger gatherings (Structures M7-26 and M7-34). Although Structure M7-35 may have been used by specific court officials, specialized governmental buildings detached from domestic lives appear to have been relatively rare. The political and diplomatic affairs of the kingdom were probably processed mostly in the residences. The pattern may be characterized as a merging of political matters and domestic lives, as well as the spatial dispersion of courtly activities.

This organizational property is closely reflected in the morphological and functional replications between royal, elite, and non-elite houses. The center rooms of the royal residences were most likely the main stages of royal audiences depicted in numerous ceramic paintings, in which rulers, who are predominantly males, sit on the throne to meet other courtiers and visitors, who stay on the floor in front of it. The meetings probably involved other attendants who occupied the patio in front of the building. In the case of Structure M7-22 of Aguateca, the center room was intentionally placed along the extension of the Causeway, presumably to allow those who stayed outside the Palace Group to see the process of royal meetings (Inomata 2001a; Inomata et al. 2001). We can thus imagine that those meetings involved diverse actors, including the highest-status male, who took the central location; other high-status individuals in front of him; females and other household members in the side rooms or nearby areas; other individuals in the patio; and possibly lower-status ones in the area beyond the patio. These different degrees of participation and their act of witnessing were probably a critical mechanism of Maya political processes (Inomata 2001c, 2006b). Our excavation data suggest the comparable use of the center rooms of the elite residences, albeit on a smaller scale. I suspect that non-elites used their residences in a similar manner to discuss the affairs of their villages and kin groups.

Despite these replications of basic configurations, there were substantial differences in scale. The glyphic texts found in Structures M8-4 and M8-10 suggest that the residents of these buildings were court officials of the highest rank, possibly members of the royal lineage. Their residences, however, were dwarfed by the Palace Group. A relatively small part of the royal compound (Structures M7-22 and M7-32) appears to have been the residential quarters, implying that the size of the Palace Group reflects not so much the number of inhabitants as the complexity of interactions that took place there and the diversity of participants in addition to the residents. In larger centers, such as Tikal and Calakmul, the royal compounds exhibit even more complex configurations, which presumably controlled the varying levels of their occupants' visibility and diverse patterns of interaction in more intricate ways. These centers with large populations possibly required more specialized and institutionalized official positions organized in a manner reminiscent of a bureaucracy (Inomata 2001c; Houston et al. 2003; Martin 2001).

Another important difference that we see between the Palace Group and other elite residences of Aguateca is the location of food preparation. Although the elite residences of Structures M7-35, M8-4, M8-8, M8-10, and M8-13 all included food preparation areas within the buildings and their immediate vicinities, the Palace Group does not appear to have possessed kitchen facilities within its main compound. The excavation next to Structure M7-9 revealed a midden with numerous large grinding stones, and I suspect that this building located behind the Palace Group was the area where food for the royal family was prepared. The placement of food preparation facilities outside the main royal compounds is also suggested for other centers, including Tikal and Caracol (Webster 2001; Harrison 1999; Chase and Chase 2001).

The elite household members of Structures M8-4, M8-8, and M8-10 were directly involved in food preparation, whether or not they were assisted by their servants, and these activities were primarily tied to the daily subsistence needs of the residents. The practice at the royal palace was different. Specialized service personnel may have been responsible for food preparation, and the royal family members were probably detached from these mundane activities. This unique configuration may have been because of the necessity of serving meals to individuals who were not members of the royal family, including court officials and visitors, particularly for the preparation of feasts. It may also reflect certain taboos, symbolism, or protocols concerning royal meals and labor. Either way, the separation of the royal personages from the most basic kind of subsistence labor distinguished them from the rest of population symbolically and experientially.

Another kind of elite activity reflected in the archaeological remains at Aguateca was the production of art objects. Scribal work and the carving of monuments were associated with the elite residences of Structures M8-4, M8-8, and M8-10, and these tasks were probably carried out mainly by male courtiers. Evidence of such activities is absent in the lower-status residences of Structures M8-2, M8-3, and M8-13, although these buildings contained remains of other craft work, as well as those of textile production by females. In addition, in the use-wear analysis of lithics excavated during the Second Phase, Aoyama (2007b) found that the portion of stone tools used for bone and shell work was substantially smaller in the Aguateca periphery than in the elite residential structures. High-ranking male courtiers were primarily responsible for the creation of the central material elements of elite culture, such as codices, stone monuments, and certain ceremonial gear, and they most likely spent a substantial time acquiring the necessary knowledge and skills, including writing, history, calendar, mathematics, and ritual (Reents-Budet 1994; Coe and Kerr 1997; Inomata 2001b; Miller and Martin 2004). Common depictions of scribal work and artistic production in ceramic paintings (K717, K760, K1185, K1196, K1220, K1221, K1225, K1252, K1257), as well as signatures of carvers on various monuments, highlight a critical point: it was not only the final material products but also the elite courtiers' acts of production and the recognition of these accomplishments by other community members that shaped notions of cultural values and social relations (Inomata 2001b). Thus, the production, appreciation, and possession of art objects did not occur in a superficial domain of culture detached from politics, but constituted a central element of political processes through which various individuals negotiated the moral values of the community, political power, and the notion of prestige.

These architectural arrangements and the patterns of space use point to a salient aspect of Maya courtly life: diverse acts, ranging from political meetings to artistic production, were highly theatrical. Many acts were meant to be witnessed, recognized, and commented on, although certain acts undoubtedly needed to be conducted in seclusion, as indicated by Colonial documents (Tozzer 1941:160). Moreover, ceremonial events and dances, designed explicitly for their theatrical effects, were an inherent part of Maya courtly life. In the Palace Group, our excavation revealed benches attached to the exterior walls of Structures M7-22 and M7-32 (Volume 1). Those benches were facing an open, low platform, Structure M7-33, which may have been used as a dancing platform (Inomata et al. 2001). Spectators occupying those benches and the patio, as well as the area across the Grieta, could appreciate dances performed on this platform. A similar possible dancing platform is reported from Copan (Fash et al. 1992). Probable communal houses, including Structure M7-34, may also have been important theatrical settings where participants from multiple households gathered. Like the Colonial-period *popol naah*, these communal buildings may have been used for both political meetings and musical practices (Inomata 2006a; Fash et al. 1992).

Larger-scale theatrical events, which potentially involved the entire community, must have been held in the Main Plaza and the Causeway. In these ceremonies, associated with certain calendrical dates and historical events, the ruler and other elites played central roles, and depictions of their acts were the primary themes of stone monuments (Grube 1992; Looper 2009). The numerous musical instruments found in the elite residences, as well as the ceremonial attire maintained in Structure M8-4 and the masks stored in the royal storage room, were probably used on those occasions. The prominence of those items in the royal and elite residences indicates that the residents dedicated substantial time and effort to the planning and preparation of those ceremonies. In this sense, their daily lives and extraordinary events cannot be understood as detached entities; they shaped and defined each other. For the Maya, theatricality and politics merged together inseparably in their concepts and practices. The preparation and implementation of theatrical events were the core element of the political process in Maya society, and shaped community identities, elite prestige, and social relations (Inomata 2006b).

Many of those elite courtiers were at the same time warriors. Aoyama has noted that the higher number of bifacial points at Aguateca than at other Maya sites probably resulted from this community's deep involvement in military affairs or from the depositing of these weapons during the final battle (Volume 2:120–128). Small obsidian points (Volume 2) and hemispherical loops made of shell (Chapter 8) may also have been weapons, but the evidence remains somewhat ambiguous. Strong interest in war is probably most clearly represented in the high number of warrior figurines identified by Triadan (Chapter 2). The theme of war was likely a perpetual subject of daily discourse and practice (Inomata 2014). Interestingly, the distribution of figurines is closely correlated with that of female-associated objects, and they may have been used primarily by women and children (Triadan 2007). In addition, the presence of figurine molds in the predominantly female space of Structure M8-4 (north room) may suggest that figurines were usually made by women. We can imagine that male children of elite descents were trained to be warriors. Elite women, too, may have actively participated in the creation of the culture of war. Moreover, reenactments of war constituted a central theme of community-wide theatrical events, which allowed diverse individuals, including warriors, women, children, and non-elites, to share the experiences and narratives of war (Inomata 2014; Inomata and Triadan 2009).

In sum, the modern categories of polity administration, domestic life, and art merged inseparably in the practice of Maya courtiers. Their engagement in those diverse acts, using sophisticated knowledge and skills of writing, calendar, mathematics, and art work, defies common anthropological models of specialization. The performance of those acts and their recognition by others, along with a strong emphasis on physical interaction, critically shaped the nature of Maya sociality and political processes. Royal and elite residences and associated buildings provided spatial settings for these processes.

Appendix
Radiocarbon Dates from Aguateca

Takeshi Inomata

Radiocarbon dates were measured at the University of Arizona Accelerator Mass Spectrometry (AMS) Laboratory in 2005 (Table A1) and were calibrated with OxCal 4.1.7 (Bronk Ramsey 2011), which incorporates the IntCal09 calibration curve (Reimer et al. 2009) (Figure A1). AA-62415 was obtained from a ritual deposit at the Barranca Escondida and shows an expected date range. In Figure A1, high probabilities are shown between AD 650 and 720, which corresponds well with the Early Nacimiento phase.

The other samples were taken from the Palace Group. AA-62416 and AA-62417 were obtained from the easternmost room, that is, the sealed storage room of Structure M7-22. AA-62414, AA-62419, and AA-62420 were taken from the termination ritual deposits found in Structure M7-32. The date of AA-62420 is clearly not acceptable, which probably resulted from the small amount of carbon. The date ranges of AA-62416, AA-62417, and AA-62419 fall largely before the expected date of AD 810 (our estimated date of the abandonment of Aguateca). These samples may have derived from building materials used in the original construction of these structures. It is also possible that these materials were deposited substantially earlier than the termination rituals because these deposits appear to have been transported from earlier refuse (see Chapter 15). Only AA-62414 shows an expected date range, but this sample alone does not contribute much to the refinement of the Aguateca chronology.

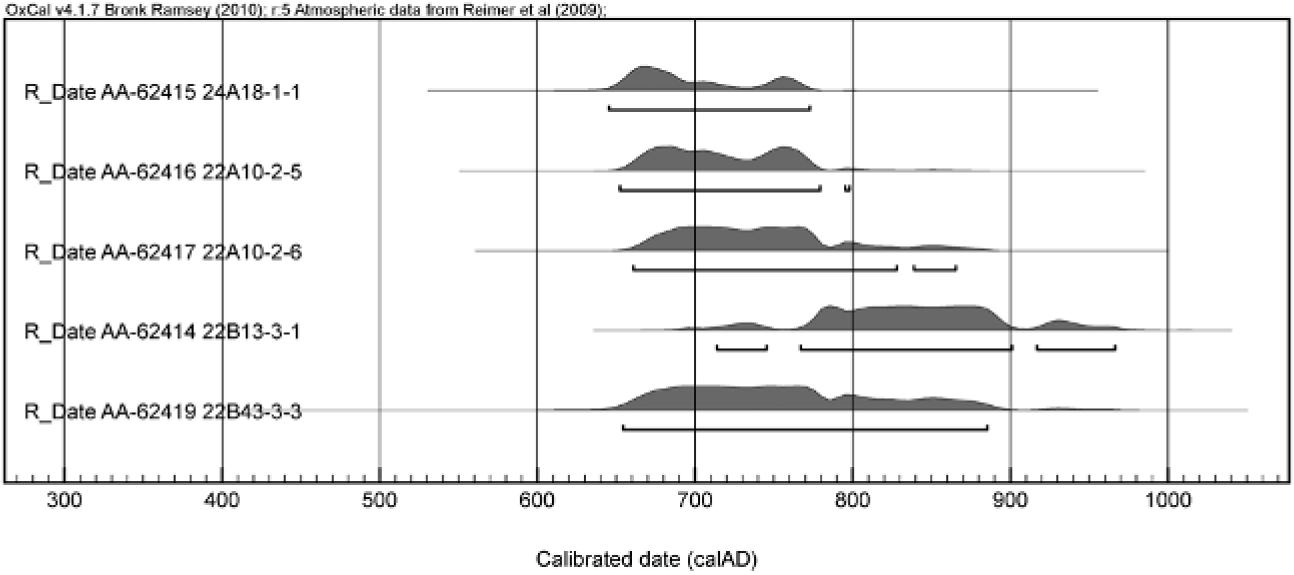


Figure A1. Probability distributions of calibrated radiocarbon dates.

Table A1. Radiocarbon Dates from Aguateca.

Lab #	Lot	Context	Ceramic phase	Material	$\delta^{13}C$	Radiocarbon date (BP)	1σ calibrated date range (cal. BC/AD)	2σ calibrated date range (cal. BC/AD)
AA-62415	24A18-1-1	Ritual deposit in the Hidden Chasm of the Barranca Escondida	Early Nacimiento	Soot attached to an incensario fragment	–26.00	1330 ± 35	AD 652–765	AD 645–773
AA-62416	22A10-2-5	Under the concentration of ceramics in front of the bench in the easternmost room of Structure M7-22	Late Nacimiento	Charcoal	–24.19	1300 ± 35	AD 667–768	AD 652–798
AA-62417	22A10-2-6	In front of the bench in the easternmost room of Structure M7-22	Late Nacimiento	Charcoal	–24.59	1275 ± 40	AD 684–772	AD 661–865
AA-62414	22B13-3-1	Termination ritual deposit in the destroyed niche of the center-room throne of Structure M7-32	Late Nacimiento	Soot attached to a Subin/ Chaquiste sherd	–20.55	1190 ± 35	AD 780–886	AD 714–966
AA-62419	22B43-3-3	Termination ritual deposit on the floor in the entrance to the center room of Structure M7-32	Late Nacimiento	Small piece of charcoal obtained in floatation	–24.83	1275 ± 60	AD 664–805	AD 654–885
AA-62420	22B10-2-4	Termination ritual deposit in front of the bench of the south room of Structure M7-32	Late Nacimiento	Small piece of charcoal obtained in floatation	–26.56	2120 ± 60	344–50 BC	361 BC–AD 2

References

Adams, Richard E. W.

1963 A Polychrome Vessel from Altar de Sacrificios, Peten, Guatemala. *Archaeology* 16(2):90–92.

1977 Comments on the Glyphic Texts of the "Altar Vase." In *Social Process in Maya Prehistory: Studies in Honour of Sir Eric Thompson*, edited by Norman Hammond, pp. 409–420. Academic Press, London.

Andrews, E. Wyllys IV

1969 *The Archaeological Use and Distribution of Mollusca in the Maya Lowlands*. Publication No. 34. Middle American Research Institute, New Orleans.

Andrews, Jean

1992 The Peripatetic Chile Pepper: Diffusion of the Domesticated Capsicums since Columbus. In *Chiles to Chocolate: Foods the Americas Gave the World*, edited by Nelson Foster and Linda S. Cordell, pp. 81–94. University of Arizona Press, Tucson.

Aoyama, Kazuo

1999 *Ancient Maya State, Urbanism, Exchange, and Craft Specialization: Chipped Stone Evidence of the Copán Valley and the La Entrada Region, Honduras*. Memoirs in Latin American Archaeology No. 12. University of Pittsburgh, Pittsburgh.

2007a Elite Artists and Craft Producers in Classic Maya Society: Lithic Evidence from Aguateca, Guatemala. *Latin American Antiquity* 18:3–26.

2007b Lítica. In *La política de lugares y comunidades en la antigua sociedad maya de Petexbatun: Las investigaciones del Proyecto Arqueológico Aguateca Segunda Fase*, edited by Takeshi Inomata, Daniela Triadan, Erick Ponciano, and Kazuo Aoyama, pp. 276–297. Ministerio de Cultura y Deportes, Dirección General del Patrimonio Cultural y Natural, and Instituto de Antropología e Historia, Guatemala City.

2009 *Elite Craft Producers, Artists, and Warriors at Aguateca: Lithic Analysis.* University of Utah Press, Salt Lake City.

Ashurst, John, and Nicola Ashurst

1988 *Practical Building Conservation, English Heritage Technical Handbook 3: Mortars, Plasters, and Renders*. Gower Publishing, London.

Bachand, Bruce R.

2006 Preclassic Excavations at Punta de Chimino, Petén, Guatemala: Investigating Social Emplacement on an Early Maya Landscape. Ph.D. dissertation, University of Arizona, Tucson.

2010 Onset of the Early Classic Period in the Southern Maya Lowlands: New Evidence from Punta de Chimino, Guatemala. *Ancient Mesoamerica* 21(1):21–44.

Balick, Michael J., Michael H. Nee, and Daniel E. Atha

2000 *Checklist of the Vascular Plants of Belize with Common Names and Uses*. Memoirs of the New York Botanical Garden, Vol. 85. New York Botanical Garden Press, Bronx.

Ballinger, Diane A., and Jeffrey Stomper

2000 The Jaguars of Altar Q, Copan, Honduras: Faunal Analysis, Archaeology, and Ecology. *Journal of Ethnobiology* 20(2):223–236.

Barragán, Felipe, Oscar G. Retana, and Eduardo J. Naranjo

2007 The Rodent Trade of Tzeltal Indians of Oxchuc, Chiapas, Mexico. *Human Ecology* 35:769–773.

Barrera Vásquez, A.

1965 *El libro de los Cantares de Dzitbalché.* Instituto Nacional de Antropología e Historia, Mexico City.

1980 *Diccionario Maya Cordemex: Maya-Español; Español-Maya*. Ediciones Cordemex, Mérida, Mexico.

Beaubien, Harriet F.

2001 Use Analysis of Stone Implements from Aguateca, Guatemala. Report filed at the Museum Conservation Institute, Smithsonian Institution.

2004a Laminados de textil y engobe: El redescubrimiento de una tecnología artesanal de la antigua Mesoamérica. In *XVII Simposio de Investigaciones Arqueológicas en Guatemala 2003*, Vol. 2, edited by Juan P. Laporte, Bárbara Arroyo, Héctor L. Escobedo and Héctor E. Mejía, pp. 665–673. Ministerio de Cultura y Deportes, Instituto de Antropología e Historia, and Asociación Tikal, Guatemala City.

2004b Ceramic Laminates: Introduction to the Craft Technology behind Aguateca's Mask. *Society for Archaeological Sciences (SAS) Bulletin* 27(4):11–13.

Beaubien, Harriet F., Emily Kaplan, and Monica Shah

2002 Textile-Clay Laminates: A New-Found Craft Technology from Ancient Mesoamerica. In *Materials Issues in Art and Archaeology VI: Materials Research Society Symposium Proceedings*, Vol. 712, edited by Pamela B. Vandiver, Martha Goodway, and Jennifer L. Mass, pp. 409–419. Materials Research Society, Warrendale, Pennsylvania.

Becker, Marshall J.
1971 The Identification of a Second Plaza Plan at Tikal, Guatemala, and Its Implications for Ancient Maya Social Complexity. Unpublished Ph.D. dissertation, University of Pennsylvania, Philadelphia.

Bell, Ellen E.
2007 Early Classic Ritual Deposits within the Copan Acropolis: The Material Foundations of Political Power at a Classic Period Maya Center. Unpublished Ph.D. dissertation, University of Pennsylvania, Philadelphia.

Bequelin, Pierre, and Claude F. Baudez
1982 *Tonina, une cité maya du Chiapas (Mexique)*. Études Mésoaméricaines, Vol. VI, Tome III. Editions Recherche sur les Civilisations, Paris.

Becquelin, P., and D. Michelet
1994 Demografía en la zona puuc: El recurso del método. *Latin American Antiquity* 5:289–311.

Becquelin, Pierre, and Eric Taladoire
1990 *Tonina, une cité maya du Chiapas (Mexique)*. Études Mésoaméricaines, Vol. VI, Tome IV. Centre d'Études Mexicaines et Centroaméricaines, Mexico City.

Benson, Elizabeth P.
1989 In Love and War: Hummingbird Lore. In *In Love and War: Hummingbird Lore and Other Selected Papers from LAILA/ALILA's 1988 Symposium*, edited by Mary H. Preuss, pp. 3–8. Labyrinthos, Culver City, California.
1997 *Birds and Beasts of Ancient Latin America*. University Press of Florida, Gainesville.
1998 The Lord, the Ruler: Jaguar Symbolism in the Americas. In *Icons of Power: Feline Symbolism in the Americas*, edited by Nicholas J. Saunders, pp. 53–76. Routledge, New York.

Bishop, Ronald L.
2003 Five Decades of Maya Fine Orange Ceramic Investigations by INAA. In *Patterns and Process: A Festschrift in Honor of Dr. Edward V. Sayre*, edited by Lambertus Van Zelst, pp. 81–91. Smithsonian Center for Materials Research and Education, Suitland, Maryland.

Blainey, Marc G.
2007 Surfaces and Beyond: The Political, Ideological and Economic Significance of Ancient Maya Iron-Ore Mirrors. Unpublished Master's thesis, Trent University, Peterborough, Ontario.

Boynton, R. S.
1980 *Chemistry and Technology of Lime and Limestone*. 2nd ed. Wiley, New York.

Brady, James E.
1989 An Investigation of Maya Ritual Cave Use with Special Reference to Naj Tunich, Peten, Guatemala. Unpublished Ph.D. dissertation, University of California, Los Angeles.

Brady, James E., Joseph W. Ball, Ronald L. Bishop, Duncan C. Pring, Norman Hammond, and Rupert A. Housley
1998 The Lowland Maya "Protoclassic": A Reconsideration of Its Nature and Significance. *Ancient Mesoamerica* 9(1):17–38.

Brady, James E., Anne Scott, Alan Cobb, Irma Rodas, John Fogarty, and Mónica Urquizú Sánchez
1997 Glimpses of the Dark Side of the Petexbatun Project: The Petexbatun Regional Cave Survey. *Ancient Mesoamerica* 8(2):353–364.

Brainerd, George W.
1958 *The Archaeological Ceramics of Yucatan.* University of California Press, Berkeley.

Breedlove, Dennis E., and Robert M. Laughlin
2000 *The Flowering of Man: A Tzotzil Botany of Zinacantán.* Smithsonian Institution Press, Washington, D.C.

Bricker, Victoria R.
1991 Faunal Offerings in the Dresden Codex. In *Sixth Palenque Round Table, 1986*, edited by Merle Greene Robertson and Virginia M. Fields, pp. 285–292. University of Oklahoma Press, Norman.

Bronk Ramsey, Christopher
2011 OxCal 4.1.7. Available at http://c14.arch.ox.ac.uk/embed.php?File=oxcal.html.

Brown, Linda A.
1996 Animal-as-Artifact/Animal-as-Representation: An Exploration of Household and Village Animal Use at the Cerén Site, El Salvador. Unpublished Ph.D. dissertation, University of Colorado, Boulder.
2001 Feasting on the Periphery. In *Feasts: Archaeological and Ethnographic Perspectives on Food, Politics, and Power*, edited by Michael Dietler and Brian Hayden, pp. 368–390. Smithsonian Institution Press, Washington, D.C.
2005 Planting the Bones: Hunting Ceremonialism at Contemporary and Nineteenth-Century Shrines in the Guatemalan Highlands. *Latin American Antiquity* 16:131–146.

Brown, Linda A., and Kitty F. Emery
2008 Negotiations with the Animate Forest: Hunting Shrines and Houses in the Maya Highlands. *Journal of Archaeological Method and Theory* 15:300–337.

Brown, Linda, and Payson Sheets
2000 Distinguishing Domestic from Ceremonial Structures in Southern Mesoamerica: Suggestions from Ceren, El Salvador. *Mayab* 13:11–21.

Bruman, Henry J.
2000 *Alcohol in Ancient Mexico.* University of Utah Press, Salt Lake City.

Buechler, Jeff
2003 Análisis preliminar de artefactos de las Operaciones 112A, B, y C. In *Informe de la temporada de 2003: Programa complementario del Proyecto Restauración Aguateca Segunda Fase*, edited by Takeshi Inomata and Markus Eberl, pp. 35–40. CATIE/UEC-PDS, Guatemala City.
2009 Conclusiones de las investigaciones en el Transecto Norte. In *La política de lugares y comunidades en la antigua sociedad maya de Petexbatun: Las investigaciones del Proyecto Arqueológico Aguateca Segunda Fase*, edited by Takeshi Inomata, Daniela Triadan, Erick Ponciano, and Kazuo Aoyama, pp. 242–243. Ministerio de Cultura y Deportes, Dirección General del Patrimonio Cultural y Natural, and Instituto de Antropología e Historia, Guatemala City.
2012 Maya Socio-Political Interaction and Domestic Architecture in the Petexbatun, Guatemala. Unpublished Ph.D. dissertation, University of Illinois, Chicago.

Buechler, Jeff, Otto Román, Juan M. Palomo, and Lindsay Wygant
2007 Excavaciones extensivas en el Transecto Norte. In *La política de lugares y comunidades en la antigua sociedad maya de Petexbatun: Las investigaciones del Proyecto Arque-*

ológico Aguateca Segunda Fase, edited by Takeshi Inomata, Daniela Triadan, Erick Ponciano, and Kazuo Aoyama, pp. 232–241. Ministerio de Cultura y Deportes, Dirección General del Patrimonio Cultural y Natural and Instituto de Antropología e Historia, Guatemala City.

Buenger, Brent A.

2003 The Impact of Wildland and Prescribed Fire on Archaeological Resources. Unpublished Ph.D. dissertation, University of Kansas, Lawrence.

Butler, Mary

1935 A Study of Maya Mouldmade Figurines. *American Anthropologist* 37(4):636–672.

Cameron, Catherine M., and Steve A. Tomka

1993 *Abandonment of Settlements and Regions: Ethnoarchaeological and Archaeological Approaches*. Cambridge University Press, Cambridge.

Carlsen, Robert S.

1987 Analysis of the Early Classic Period Textile Remains from Tomb 23, Río Azul, Guatemala. In *Río Azul Reports Number 3: The 1985 Season*, edited by R. E. W. Adams, pp. 152–160. Center for Archaeological Research, University of Texas, San Antonio.

Carr, Helen S.

1991 The Maya Medicinal Turtle, Xkokak, and a Suggested Alternate Reading of Two Yucatec Ethnomedical Texts. *Journal of Ethnobiology* 11(2):187–192.

1996 Precolumbian Maya Exploitation and Management of Deer Populations. In *The Managed Mosaic: Ancient Maya Agriculture and Resource Use*, edited by S. L. Fedick, pp. 251–261. University of Utah Press, Salt Lake City.

Carter, Nicholas

2010 Plate 80: Drinking Vessel with Deities Spearing a Shark. In *Fiery Pool: The Maya and the Mythic Sea*, edited by Daniel Finamore and Stephen D. Houston, pp. 246–247. Peabody Essex Museum, Salem, Massachusetts.

Chase, Arlen F., and Diane Z. Chase

1987 Investigations at the Classic Maya City of Caracol, Belize, 1985–1987. In *Investigations at the Classic Maya City of Caracol, Belize, 1985–1987*, pp. 1–84. Pre-Columbian Art Research Institute Monograph No. 3. Pre-Columbian Art Research Institute, San Francisco.

2001 The Royal Court of Caracol, Belize: Its Palaces and People. In *Royal Courts of the Ancient Maya, Volume 2: Data and Case Study*, edited by Takeshi Inomata and Stephen D. Houston, pp. 102–137. Westview Press, Boulder, Colorado.

Clark, John E.

1988 *The Lithic Artifacts of La Libertad, Chiapas, Mexico: An Economic Perspective.* Brigham Young University, Provo, Utah.

Clayton, Sarah C., W. David Driver, and Laura J. Kosakowsky

2005 A Response to "Public Architecture, Ritual, and Temporal Dynamics at the Maya Center of Blue Creek, Belize," by Thomas H. Guderjan. *Ancient Mesoamerica* 16:119–130.

Clutton-Brock, J., and Norman Hammond

1994 Hot Dogs: Comestible Canids in Preclassic Maya Culture at Cuello, Belize. *Journal of Archaeological Sciences* 21:819–826.

Coe, Michael D.

1977 Supernatural Patrons of Maya Scribes and Artists. In *Social Process in Maya Prehistory: Essays in Honor of Sir Eric Thompson*, edited by Norman Hammond, pp. 327–349. Academic Press, London.

1997 *The Maya.* Thames and Hudson, London.

Coe, Michael D., and Elizabeth P. Benson

1966 *Three Maya Relief Panels at Dumbarton Oaks*. Studies in Pre-Columbian Art and Archaeology No. 2. Dumbarton Oaks, Washington, D.C.

Coe, Michael D., and Justin Kerr

1997 *The Art of the Maya Scribe.* Harry N. Abrams, New York.

Coe, Sophie D.

1994 *America's First Cuisines.* University of Texas Press, Austin.

Coe, William R.

1959 *Piedras Negras Archaeology: Artifacts, Caches, and Burials.* Museum Monographs. University Museum, University of Pennsylvania, Philadelphia.

Coe, William R., and William A. Haviland

1982 *Introduction to the Archaeology of Tikal, Guatemala. Tikal Report No. 12*. University Museum Monograph No. 46. University of Pennsylvania, Philadelphia.

Corona-M., Eduardo

1997 Avian Resources at a Mexican Site at the Time of the Spanish Conquest. *International Journal of Osteoarchaeology* 7:321–325.

Culbert, T. Patrick

1993 *The Ceramics of Tikal. Tikal Report No. 25.* University Museum Monograph No. 81. University of Pennsylvania, Philadelphia.

Culbert, T. Patrick, and Don S. Rice

1990 *Precolumbian Population History in the Maya Lowlands.* University of New Mexico Press, Albuquerque.

Dacus, Chelsea

2005 Weaving the Past: An Examination of Bones Buried with an Elite Maya Woman. Unpublished Master's thesis, Southern Methodist University, Dallas.

Dahlin, Bruce H.

2000 The Barricade and Abandonment of Chunchucmil: Implications for Northern Maya Warfare. *Latin American Antiquity* 11(3):283–298.

Demarest, Arthur A.

1997 The Vanderbilt Petexbatun Regional Archaeological Project, 1989–1994: Overview, History, and Major Results of a Multidisciplinary Study of the Classic Maya Collapse. *Ancient Mesoamerica* 8:209–228.

Demarest, Arthur A., Hector Escobedo, Juan Antonio Valdés, Stephen D. Houston, Lori E. Wright, and Kitty F. Emery

1991 Arqueologia, epigrafia, y el descubrimiento de una tumba real en el centro ceremonial de Dos Pilas, Peten, Guatemala. *U Tz'ib* 1(1):14–28.

Demarest, Arthur A., Matt O'Mansky, Claudia Wolley, Dirk Van Tuerenhout, Takeshi Inomata, Joel Palka, and Héctor Escobedo

1997 Classic Maya Defensive Systems and Warfare in the Petexbatun Region: Archaeological Evidence and Interpretation. *Ancient Mesoamerica* 8:229–254.

Díaz Samayoa, Carolina, and Juan A. Valdés

1999 Estructura M8-11. In *Informe anual del Proyecto de Restauración Aguateca, enero–diciembre 1999*, edited by Juan A. Valdés, Mónica Urquizú, Carolina Díaz-Samoya, and

Horacio Martínez Pais, pp. 20–24. Instituto de Antropología e Historia de Guatemala, Programa de Desarrollo Sostenible de Petén, BID-IDAEH, Guatemala City.

2000 Estructura M8-37. In *Informe final del Proyecto de Restauración Aguateca, enero–mayo 2000*, edited by Juan A. Valdés, Mónica Urquizú, Carolina Díaz-Samayoa, and Horacio Martínez Pais, pp. 107–111. Instituto de Antropología e Historia de Guatemala, Programa de Desarrollo Sostenible de Petén, BID-IDAEH, Guatemala City.

Digby, Adrian

1964 *Maya Jades.* British Museum, London.

Douglas, William

1967 Illness and Curing in Santiago Atitlán, a Tzutujil Maya Community in the Southwestern Highlands of Guatemala. Unpublished Ph.D. dissertation, Stanford University, Palo Alto, California.

Doyle, James

2010 Plate 35: Shell Plaque with a Lord Smoking. In *Fiery Pool: The Maya and the Mythic Sea*, edited by Daniel Finamore and Stephen D. Houston, pp. 114–115. Peabody Essex Museum, Salem, Massachusetts.

Dunning, Nicholas, Timothy Beach, and David Rue

1997 The Paleoecology and Ancient Settlement of the Petexbatun Region, Guatemala. *Ancient Mesoamerica* 8(2):255–266.

Durán, Diego de

1967 *Historia de las Indias de Nueva Espana, y Islas de la Tierra Firme*. Edited by Ángel M. Garibay Kintana. Porrúa, Mexico City.

Easby, Elizabeth K.

1961 The Squier Jades from Toniná, Chiapas. In *Essays in Pre-Columbian Art and Archaeology*, edited by Samuel K. Lothrop, pp. 60–80. Harvard University Press, Cambridge.

Eberl, Markus

2000 Rescate y excavaciones en el área de las nuevas estlas: Operación 24. In *Informe del Proyecto Arqueológico Aguateca: La temporada de campo 1999*, edited by Erick Ponciano, Takeshi Inomata, and Daniela Triadan, pp. 68–73. Report submitted to the Instituto de Antropología y Historia de Guatemala, Guatemala City.

2003 An Ik Site Vessel from Aguateca. *Mexicon* 25(2):38–39.

2007 Community Heterogeneity and Integration: The Maya Sites of Nacimiento, Dos Ceibas, and Cerro de Cheyo (El Peten, Guatemala) during the Late Classic. Unpublished Ph.D. dissertation, Tulane University, New Orleans.

2009 Conclusiones de las investigaciones en Nacimiento y el Transecto Sur. In *La política de lugares y comunidades en la antigua sociedad maya de Petexbatun: Las investigaciones del Proyecto Arqueológico Aguateca Segunda Fase*, edited by Takeshi Inomata, Daniela Triadan, Erick Ponciano, and Kazuo Aoyama, pp. 180–181. Ministerio de Cultura y Deportes, Dirección General del Patrimonio Cultural y Natural, and Instituto de Antropología e Historia, Guatemala City.

Eberl, Markus, and Takeshi Inomata

2001 Maya Royal Headband (sak huunal) from Aguateca. *Mexicon* XXIII:134–135.

Eberl, Markus, María de los Ángeles Corado, Claudia Vela González, Takeshi Inomata, Daniela Triadan, Jenny Guerra Ruiz, and Alejandro Seijas

2009 El asentamiento preclásico del sitio arqueológico Dos Ceibas en la región del Petexbatún, Guatemala. *Mexicon* 31(6):134–141.

Eberl, Markus, Daniela Triadan, and Takeshi Inomata

2009 Excavaciones extensivas en Dos Ceibas. In *La política de lugares y comunidades en la antigua sociedad maya de Petexbatun: Las investigaciones del Proyecto Arqueológico Aguateca Segunda Fase*, edited by Takeshi Inomata, Daniela Triadan, Erick Ponciano, and Kazuo Aoyama, pp. 171–179. Ministerio de Cultura y Deportes, Guatemala City.

Ekholm, Gordon F.

1962 U-Shaped "Ornaments" Identified as Finger-Loops from Atlatls. *American Antiquity* 28(2):181

Emery, Kitty F.

1986 Variation in a Tropical Gastropod Population: Implications for Ancient Maya Subsistence Patterns. Unpublished Honours Bachelor of Science thesis, Trent University, Peterborough, Ontario.

1997 The Maya Collapse: A Zooarchaeological Investigation. Unpublished Ph.D. dissertation, Cornell University, Ithaca, New York.

1998 Uso de fauna en grupos domésticos: Dieta y ritual en Aguateca. In *Informe preliminar del Proyecto Aguateca: La temporada de 1998*, edited by Takeshi Inomata, Erick Ponciano, and Daniela Triadan. Instituto de Antropologia e Historia, Guatemala City.

1999 Artifact Production and Use at Aguateca. In *Informe preliminar del Proyecto Arqueologico Aguateca: La temporada de 1999*, edited by Erick Ponciano, Takeshi Inomata, and Daniela Triadan. Instituto de Antropologia e Historia, Guatemala City.

2003a The Noble Beast: Status and Differential Access to Animals in the Maya World. *World Archeology* 34(3):498–515.

2003b Restos animales. In *Informe final de la temporada de Laboratorio del Proyecto Arqueológico Aguateca*, edited by Daniela Triadan and Takeshi Inomata, pp. 26–31. Instituto de Antropologia e Historia, Guatemala City.

2004 Animals from the Maya Underworld: Reconstructing Elite Maya Ritual at the Cueva de los Quetzales. In *Behavior behind Bones: The Zooarchaeology of Religion, Ritual, Status, and Identity*, edited by Sharyn Jones O'Day, Wim Van Neer, and Anton Ervynck, pp. 101–113. Oxbow Books, Oxford.

2007a Aprovechamiento de la fauna en Piedras Negras: Dieta, ritual y artesanie del período clásico maya. *Mayab* 19:51–69.

2007b Assessing the Impact of Ancient Maya Animal Use. *Journal for Nature Conservation* 15(3):184–195.

2008 Techniques of Ancient Maya Bone Working: Evidence from a Classic Maya Deposit. *Latin American Antiquity* 19(2):204–221.

2009 Perspectives on Ancient Maya Bone Crafting from a Classic Period Bone-Artifact Manufacturing Assemblage. *Journal of Anthropological Archaeology* 28(4):458–470.

2010 *Dietary, Environmental, and Societal Implications of Ancient Maya Animal Use in the Petexbatun: A Zooarchaeo-*

logical Perspective on the Collapse. Vanderbilt University Press, Nashville, Tennessee.

2011 Medicinal Use of Animal Products by the Maya of Guatemala: Implications for Zooarchaeology. Paper presented at the 34th Annual Meeting of the Society of Ethnobiology, Columbus, Ohio.

2012 The Motul de San José Animals in an Economic Perspective. In *Motul de San José: Politics, History, and Economy in a Classic Maya Polity*, edited by Antonia Foias and Kitty F. Emery, pp. 291–325. University Press of Florida, Gainesville.

Emery, Kitty F., and Kazuo Aoyama

2007 Bone, Shell, and Lithic Evidence for Crafting in Elite Maya Households at Aguateca, Guatemala. *Ancient Mesoamerica* 18(1):69–89.

Emery, Kitty F., and Linda A. Brown

n.d. Animal Refuse Disposal Practices among the Itzaj Maya of the Peten Lakes Region, Guatemala.

2012 Maya Hunting Sustainability: Perspectives from Past and Present. In *To Report or Not to Report: Amerindian Warfare, Environmental Degradation, and the Anthropologist's Dilemma*, edited by Richard J. Chacon and Rubén G. Mendoza, pp. 79–116. Springer Press, New York.

Emery, Kitty F., Susan Milbrath, Elyse Anderson, and Erol Kavountzis

2009 Maya Codices, Caves, and Animals: Zooarchaeological and Symbolic Evidence. Paper presented at the Animal Symbolism in the Mesoamerican Codex Tradition, Albuquerque, New Mexico.

Emery, Kitty, Lori Wright, and Henry Schwarcz

2000 Isotopic Analysis of Ancient Deer Bone: Biotic Stability in Collapse Period Maya Land-Use. *Journal of Archaeological Science* 27(6):537–550.

Escobedo Ayala, Héctor L.

1997 Arroyo de Piedra: Sociopolitical Dynamics of a Secondary Center in the Petexbatun Region. *Ancient Mesoamerica* 8(2):307–320.

2006 History and Dynastic Politics in a Classic Maya Court: Investigations at Arroyo de Piedra, Guatemala. Unpublished Ph.D. dissertation, Vanderbilt University, Nashville, Tennessee.

Escobedo, Héctor L., Jorge M. Samayoa, and Oswaldo Gómez

1994 Las Pacayas: Un nuevo sitio arqueológico en la región Petexbatún. In *VII Simposio de Investigaciones Arqueológicas en Guatemala, 1993*, edited by Juan P. Laporte and Héctor L. Escobedo, pp. 515–538. Ministerio de Cultura y Deportes, Instituto de Antropología e Historia, and Asociación Tikal, Guatemala City.

Evans, Susan Toby (editor)

2010 *Ancient Mexican Art at Dumbarton Oaks*. Pre-Columbian Art at Dumbarton Oaks No. 3. Dumbarton Oaks Research Library and Collection, Washington, D.C.

Fahsen, Federico

2002 Rescuing the Origins of Dos Pilas Dynasty: A Salvage of Hieroglyphic Stairway #2, Structure L5-49. Report submitted to the Foundation for the Advancement of Mesoamerican Research, http://www.famsi.org/reports/01098/.

2003 La Escalinata 2 de Dos Pilas, Petén: Los nuevos escalones. In *XVI Simposio de Investigaciones Arqueológicas en Guatemala, 2002*, edited by Juan P. Laporte, Bárbara Arroyo, Héctor L. Escobedo, and Héctor Mejía, pp. 687–700. Ministerio de Cultura y Deportes, Instituto de Antropología e Historia, and Asociación Tikal, Guatemala City.

Fash, Barbara, William Fash, Sheree Lane, Rudy Larios, Linda Schele, Jeffrey Stomper, and David Stuart

1992 Investigations of a Classic Maya Council House at Copán, Honduras. *Journal of Field Archaeology* 19:419–442.

Fash, William L.

1991 *Scribes, Warriors, and Kings: The City of Copán and the Ancient Maya*. Thames and Hudson, London.

Fedick, Scott L.

1996 Conclusion: Landscape Approaches to the Study of Ancient Maya Agriculture. In *The Managed Mosaic: Ancient Maya Agriculture and Resource Use*, edited by Scott L. Fedick, pp. 335–347. University of Utah Press, Salt Lake City.

Fields, Virginia M.

1991 The Iconographic Heritage of the Maya Jester God. In *Sixth Palenque Round Table, 1986*, edited by Virginia M. Fields, pp. 167–174. University of Oklahoma Press, Norman.

Finamore, Daniel

2010 Navigating the Maya World. In *Fiery Pool: The Maya and the Mythic Sea*, edited by Daniel Finamore and Stephen D. Houston, pp. 144–159. Peabody Essex Museum, Salem, Massachusetts.

Finamore, Daniel, and Stephen D. Houston (editors)

2010 *Fiery Pool: The Maya and the Mythic Sea.* Peabody Essex Museum, Salem, Massachusetts.

Fitzsimmons, James L.

2009 *Death and the Classic Maya Kings*. University of Texas Press, Austin.

Flannery, Kent V., and Marcus C. Winter

1976 Analyzing Household Activities. In *The Early Mesoamerican Village*, edited by Kent V. Flannery, pp. 34–47. Academic Press, Orlando, Florida.

Foias, Antonia E.

1996 Changing Ceramic Production and Exchange Systems and the Classic Maya Collapse in the Petexbatun Region. Unpublished Ph.D. dissertation, Nashville, Tennessee.

Foias, Antonia E., and Ronald L. Bishop

1997 Changing Ceramic Production and Exchange in the Petexbatun Region, Guatemala: Reconsidering the Classic Maya Collapse. *Ancient Mesoamerica* 8:275–292.

Freidel, David A.

1990 The Jester God: The Beginning and End of a Maya Royal Symbol. In *Vision and Revision in Maya Studies*, edited by Flora S. Clancy and Peter D. Harrison, pp. 67–78. University of New Mexico Press, Albuquerque.

Freidel, David A., Barbara MacLeod, and Charles K. Suhler

2003 Early Classic Maya Conquest in Words and Deeds. In *Ancient Mesoamerican Warfare*, edited by Kathryn Brown and Travis W. Stanton, pp. 189–216. AltaMira Press, Walnut Creek, California.

Freidel, David A., and F. Kent Reilly

2009 The Flesh of the God: Cosmology, Food, and the Origins of Political Power in Ancient Southeastern Mesoamerica.

In *Pre-Columbian Foodways: Interdisciplinary Approaches to Food, Culture, and Markets in Mesoamerica*, edited by John E. Staller and Michael Carrasco, pp. 635–680. Springer, New York.

Freidel, David A., Michelle Rich, and F. Kent Reilly III

2010 Resurrecting the Maize King. *Archaeology* 63(5):42–45.

Garber, James F.

1983 Patterns of Jade Consumption and Disposal at Cerros, Northern Belize. *American Antiquity* 48:800–807.

García Barrios, Ana

2008 Chaahk, el dios de la lluvia, en el período clásico maya: Aspectos religiosos y políticos. Unpublished Ph.D. dissertation, Universidad Complutense de Madrid, Madrid.

Geertz, Clifford

1973 *The Interpretation of Cultures: Selected Essays.* Basic Books, New York.

Golden, Charles, Andrew K. Scherer, A. R. Muñoz, and Rosaura Vásquez

2008 Piedras Negras and Yaxchilan: Divergent Political Trajectories in Adjacent Maya Polities. *Latin American Antiquity* 19(3):249–274.

Gossen, Gary

1974 *Chamulas in the World of the Sun*. Harvard University Press, Cambridge.

Gotz, Christopher

2008 Coastal and Inland Patterns of Faunal Exploitation in the Prehispanic Northern Maya Lowlands. *Quaternary International* 191:154–169.

Graham, Ian

1967 *Archaeological Explorations in El Peten, Guatemala*. Middle American Research Institute Publication No. 33. Tulane University, New Orleans.

1996 *Corpus of Maya Hieroglyphic Inscriptions, Volume 7, Part 1: Seibal*. Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge.

Graham, John A.

1990 *Excavations at Seibal, Department of Peten, Guatemala: Monumental Sculpture and Hieroglyphic Inscriptions.* Memoirs of the Peabody Museum of Archaeology and Ethnology, Vol. 14, No. 1. Harvard University, Cambridge.

Grube, Nikolai

1992 Classic Maya Dance: Evidence from Hieroglyphs and Iconography. *Ancient Mesoamerica* 3(2):201–218.

1998 Speaking through Stones: A Quotative Particle in Maya Hieroglyphic Inscriptions. In *50 Years of Americanist Studies at the University of Bonn*, edited by Sabine Dedenbach-Salazar Sáez, Carmen Arrellano Hoffmann, Eva König, and Heiko Prümers, pp. 543–558. Anton Saurwein, Bonn.

Grube, Nikolai, and Maria Gaida

2006 *Die Maya: Schrift und Kunst*. SMB-DuMont, Berlin.

Grube, Nikolai, and Werner Nahm

1994 A Census of Xibalba: A Complete Inventory of Way Characters on Maya Ceramics. In *The Maya Vase Book, Volume 4: A Corpus of Rollout Photographs of Maya Vases*, edited by Barbara and Justin Kerr, pp. 686–715. Kerr Associates, New York.

Grube, Nikolai, and Linda Schele

1994 Kuy, the Owl of Omen and War. *Mexicon* 16(1):10–17.

Guenter, Stanley P.

2003 *The Inscriptions of Dos Pilas Associated with B'ajlaj Chan K'awiil.* www.mesoweb.com/features/guenter/DosPilas.pdf.

Halperin, Christina T.

2008 Materiality, Bodies, and Practice: The Political Economy of Late Classic Maya Figurines from Motul de San José, Petén, Guatemala. Unpublished Ph.D. dissertation, University of California, Riverside.

Halperin, Christina T., Sergio Garza, Keith Prufer, and James E. Brady

2001 *Caves and the Ancient Maya Ritual Use of Jute*. Florida State University, Tallahassee.

Hamblin, Nancy L.

1984 *Animal Use by the Cozumel Maya*. University of Arizona Press, Tucson.

Hammond, Norman

1972 Classic Maya Music, Part 2: Rattles, Shakers, Raspers, Wind and String instruments. *Archaeology* 25:124–228.

1975 *Lubaantun, a Classic Maya Realm.* Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge.

Hammond, Norman, Gair Tourtellot, Gloria Everson, Kerry L. Sagebiel, Ben Thomas, and Marc Wolf

2000 Survey and Excavations at La Milpa, Belize, 1998. *Mexicon* 22:38–43.

Harrison, Peter D.

1999 *The Lords of Tikal: Rulers of an Ancient Maya City.* Thames and Hudson, London.

Hayden, Brian, and Aubrey Cannon

1984 *The Structure of Material Systems: Ethnoarchaeology in the Maya Highlands.* Society for American Archaeology, Washington, D.C.

Healy, Paul F.

1988 Music of the Maya. *Archaeology* 41(1):24–31.

1990 Excavations at Pacbitun, Belize: Preliminary Report on the 1986 and 1987 Investigations. *Journal of Field Archaeology* 17(3):247–226.

Healy, Paul F., and Marc G. Blainey

2011 Ancient Maya Mosaic Mirrors: Function, Symbolism, and Meaning. *Ancient Mesoamerica* 22:229–244.

Healy, Paul F., Kitty F. Emery, and Lori E. Wright

1990 Ancient and Modern Maya Exploitation of the Jute Snail (Pachychilus). *Latin American Antiquity* 1(2):170–183.

Hellmuth, Nicholas M.

1996 *Headdresses and Skirts Shared by Deer Hunters and Ballplayers*. National Museum of Ethnology, Osaka, Japan.

Hendon, Julia A.

1997 Women's Work, Women's Space, and Women's Status among the Classic-Period Maya Elite of the Copan Valley, Honduras. In *Women in Prehistory: North America and Mesoamerica*, edited by C. Claassen and R. A. Joyce, pp. 33–46. University of Pennsylvania Press, Philadelphia.

2000 Having and Holding: Storage, Memory, Knowledge, and Social Relations. *American Anthropologist* 102(1):42–53.

Hermes, Bernard
2000 Entierro 49. In *El sitio maya de Topoxté: Investigaciones en una isla del Lago Yaxhá, Petén, Guatemala*, edited by Wolfgang W. Wurster, pp. 127–144. Philipp von Zabern, Mainz am Rhein.

Hidalgo-Mihart, Mircea G., Lisette Cantú-Salazar, Alberto González-Romero, and Carlos A. López-González
2004 Historical and Present Distribution of Coyote (*Canis latrans*) in Mexico and Central America. *Journal of Biogeography* 31:2025–2038.

Hohmann, Bobbie
2002 Preclassic Maya Shell Ornament Production in the Belize Valley, Belize. Unpublished Ph.D. dissertation, University of New Mexico, Albuquerque.

House, Paul, S. Lagos-Witte, L. Ochoa, C. Torres, T. Mejia, and M. Rivas
1995 *Plantas medicinales comunes de Honduras.* Universidad Nacional Autónoma de Honduras, Tegucigalpa.

Houston, Stephen D.
1989 Monumentos de Punta de Chimino. In *El Proyecto Arqueológico Regional Petexbatun, Informe Preliminar 1*, edited by Arthur A. Demarest and Stephen D. Houston, pp. 143–144. Submitted to Instituto de Antropologia e Historia, Guatemala City.
1993 *Hieroglyphs and History at Dos Pilas: Dynastic Politics of the Classic Maya.* University of Texas Press, Austin.
2009 A Splendid Predicament: Young Men in Classic Maya Society. *Cambridge Archaeological Journal* 19(2):149–178.
2010 Living Waters and Wondrous Beasts. In *Fiery Pool: The Maya and the Mythic Sea*, edited by Daniel Finamore and Stephen D. Houston, pp. 66–79. Peabody Essex Museum, Salem, Massachusetts.

Houston, Stephen D., Claudia Brittenham, Cassandra Mesick, Alexandre Tokovinine, and Christina Warinner
2009 *Veiled Brightness: A History of Ancient Maya Color*. University of Texas Press, Austin.

Houston, Stephen D., Héctor Escobedo, Mark Child, C. Golden, and Rene Muñoz
2003 The Moral Community: Maya Settlement Transformation at Piedras Negras, Guatemala. In *The Social Construction of Ancient Cities*, edited by Monica L. Smith, pp. 212–253. Smithsonian Books, Washington, D.C.

Houston, Stephen D., Hector Escobedo, Mark Child, Charles Golden, Rene Muñoz, and Monica Urquizu
1998a Monumental Architecture at Piedras Negras, Guatemala: Time, History, and Meaning. *Mayab* 11:40–56.

Houston, Stephen, Héctor Escobedo, Mark Child, Charles Golden, Richard Terry, and David Webster
2000 In the Land of the Turtle Lords: Archaeological Investigations at Piedras Negras, Guatemala, 2000. *Mexicon* 22: 97–110.

Houston, Stephen D., Héctor Escobedo, Donald Forsyth, Perry Hardin, David Webster, and Lori Wright
1998b On the River of Ruins: Explorations at Piedras Negras, Guatemala. *Mexicon* 20:16–22.

Houston, Stephen D., and Takeshi Inomata
2009 *The Classic Maya*. Cambridge University Press, New York.

Houston, Stephen, and David Stuart
1993 Multiple Voices in Maya Writing: Evidence for First- and Second-Person References. Paper presented at the 58th Annual Meeting of the Society for American Archaeology, St. Louis.

Houston, Stephen, David Stuart, and John Robertson
2004 Disharmony in Maya Hieroglyphic Writing: Linguistic Change and Continuity in Classic Society. In *The Linguistics of Maya Writing*, edited by Søren Wichmann, pp. 83–101. University of Utah Press, Salt Lake City.

Houston, Stephen D., David Stuart, and Karl Taube
2006 *The Memory of Bones: Body, Being, and Experience among the Classic Maya*. University of Texas Press, Austin.

Inomata, Takeshi
1995 Archaeological Investigations at the Fortified Center of Aguateca, El Petén, Guatemala: Implications for the Study of the Classic Maya Collapse. Unpublished Ph.D. dissertation, Vanderbilt University, Nashville, Tennessee.
1997 The Last Day of a Fortified Classic Maya Center: Archaeological Investigations at Aguateca, Guatemala. *Ancient Mesoamerica* 8:337–351.
2001a The Classic Maya Royal Palace as a Political Theater. In *Reconstruyendo la ciudad maya: El urbanismo en la sociedad antigua*, edited by Andrés Ciudad Ruiz, Iglesias Ponce de León, María Josefa Iglesias, and María d. C. Martínez, pp. 341–362. Sociedad Española de Estudios Mayas, Madrid.
2001b The Power and Ideology of Artistic Creation: Elite Craft Specialists in Classic Maya Society. *Current Anthropology* 42:321–333.
2001c King's People: Classic Maya Royal Courtiers in a Comparative Perspective. In *Royal Courts of the Ancient Maya, Volume 1: Theory, Comparison, and Synthesis*, edited by Takeshi Inomata and Stephen D. Houston, pp. 27–53. Westview Press, Boulder, Colorado.
2003 War, Destruction, and Abandonment: The Fall of the Classic Maya Center of Aguateca, Guatemala. In *The Archaeology of Settlement Abandonment in Middle America*, edited by Takeshi Inomata and Ronald W. Webb, pp. 43–60. University of Utah Press, Salt Lake City.
2004 The Spatial Mobility of Non-elite Populations in Classic Maya Society and Its Political Implications. In *Ancient Maya Commoners*, edited by Jon C. Lohse and Fred Valdez Jr., pp. 175–196. University of Texas Press, Austin.
2006a Politics and Theatricality in Maya Society. In *Archaeology of Performance: Theaters of Power, Community, and Politics*, edited by Takeshi Inomata and Lawrence S. Coben, pp. 187–222. AltaMira Press, Lanham, Maryland.
2006b Plazas, Performers, and Spectators: Political Theaters of the Classic Maya. *Current Anthropology* 47:805–842.
2007a *Warfare and the Fall of a Fortified Center: Archaeological Investigations at Aguateca.* Vanderbilt Institute of Mesoamerican Archaeology, Vol. 3. Vanderbilt University Press, Nashville, Tennessee.
2007b Knowledge and Belief in Craft Production by Classic Maya Elites. In *Rethinking Production in Archaeological Contexts*, edited by Zachary X. Hruby and Rowan Flad,

pp. 129–141. Archaeological Papers No. 17. American Anthropological Association, Arlington, Virginia.

2008 Women in Classic Maya Royal Courts. In *Servants of the Dynasty: Palace Women in World History*, edited by Anne Walthall, pp. 45–64. University of California Press, Berkeley.

2011 La secuencia cerámica de Ceibal. In *Informe del Proyecto Arqueológico Ceibal-Petexbatun: Temporada 2011*, edited by Victor Castillo Aguilar and Takeshi Inomata, pp. 157–167. Report presented to Instituto de Antropología e Historia, Guatemala City.

2014 War, Violence, and Society in the Maya Lowlands. In *Embattled Bodies, Embattled Places: War in Pre-Columbian America*, edited by Andrew Scherer and John Verano. Dumbarton Oaks Research Library and Collection, Washington, D.C.

n.d. Fire and Settlement Abandonment in the Maya Lowlands. Manuscript on file.

Inomata, Takeshi, and Stephen D. Houston

2001a *Royal Courts of the Ancient Maya: Volume 2: Data and Case Studies.* Westview, Boulder, Colorado.

2001b Opening the Royal Maya Court. In *Royal Courts of the Ancient Maya, Volume 1: Theory, Comparison, and Synthesis*, edited by T. Inomata and S. D. Houston, pp. 3–23. Westview Press, Boulder, Colorado.

Inomata, Takeshi, and John T. Murphy

2000 Grupo L8-9. In *Informe del Proyecto Arqueológico Aguateca: La temporada de campo 1999*, edited by Erick Ponciano, Takeshi Inomata, and Daniela Triadan, pp. 86–89. Unpublished report, Instituto de Antropología e Historia de Guatemala, Guatemala City.

Inomata, Takeshi, and Erick Ponciano

2010 The Palace Group. In *Burned Palaces and Elite Residences of Aguateca: Excavations and Ceramics,* edited by Takeshi Inomata and Daniela Triadan, pp. 23–52. Monographs of the Aguateca Archaeological Project First Phase, Vol. 1. University of Utah Press, Salt Lake City.

Inomata, Takeshi, Erick Ponciano, Oswaldo Chinchilla, Otto Román, Véronique Breuil-Martínez, and Oscar Santos

2004 An Unfinished Temple at the Classic Maya Center of Aguateca, Guatemala. *Antiquity* 78(302):798–811.

Inomata, Takeshi, and Laura R. Stiver

1998 Floor Assemblages from Burned Structures at Aguateca, Guatemala: A Study of Classic Maya Households. *Journal of Field Archaeology* 25:431–452.

Inomata, Takeshi, and Daniela Triadan

2003 Where Did Elite Live? Identifying Elite Residences at Aguateca, Guatemala. In *Maya Palaces and Elite Residences: An Interdisciplinary Approach*, edited by J. J. Christie, pp. 154–183. University of Texas Press, Austin.

2009 Culture and Practice of War in Maya Society. In *Warfare in Cultural Context: Practice, Agency, and the Archaeology of Violence*, edited by Axel E. Nielsen and William H. Walker, pp. 56–83. University of Arizona Press, Tucson.

Inomata, Takeshi, and Daniela Triadan (editors)

2010 *Burned Palaces and Elite Residences of Aguateca: Excavations and Ceramics*. Monographs of the Aguateca Archaeological Project First Phase, Vol. 1. University of Utah Press, Salt Lake City.

Inomata, Takeshi, Daniela Triadan, and Estela Pinto

2010 Complete, Reconstructible, and Partial Vessels. In *Burned Palaces and Elite Residences of Aguateca: Excavations and Ceramics*, pp. 180–361. Monographs of the Aguateca Archaeological Project First Phase, Vol. 1. University of Utah Press, Salt Lake City.

Inomata, Takeshi, Daniela Triadan, Erick Ponciano, and Kazuo Aoyama (editors)

2009 *La política de lugares y comunidades en la antigua sociedad maya de Petexbatun: Las investigaciones del Proyecto Arqueológico Aguateca Segunda Fase.* Ministerio de Cultura y Deportes, Dirección General del Patrimonio Cultural y Natural, and Instituto de Antropología e Historia, Guatemala City.

2012 *La política de lugares y comunidades en la antigua sociedad maya de Petexbatun: Las investigaciones del Proyecto Arqueológico Aguateca Segunda Fase.* 2nd ed. Publicación Especial 50. Academia de Geografía e Historia de Guatemala, Guatemala City.

Inomata, Takeshi, Daniela Triadan, Erick Ponciano, Estela Pinto, Richard E. Terry, and Markus Eberl

2002 Domestic and Political Lives of Classic Maya Elites: The Excavation of Rapidly Abandoned Structures at Aguateca, Guatemala. *Latin American Antiquity* 13:305–330.

Inomata, Takeshi, Daniela Triadan, Erick Ponciano, Richard Terry, and Harriet F. Beaubien

2001 In the Palace of the Fallen King: The Royal Residential Complex at Aguateca, Guatemala. *Journal of Field Archaeology* 28:287–306.

Inomata, Takeshi, Daniela Triadan, Erick Ponciano, Richard E. Terry, Estela Pinto, and S. Coyston

1998 Residencias de la familia real y de la elite en Aguateca, Guatemala. *Mayab* 11:23–39.

Inomata, Takeshi, Daniela Triadan, and Otto R. Román

2010 La transformación y continuidad de ritos durante el período preclásico en Ceibal, Guatemala. In *El ritual en el mundo maya: De lo privado a lo público*, edited by Andrés Ciudad Ruiz, Iglesias Ponce de León, María Josefa, and Miguel Sorroche, pp. 29–48. Sociedad Española de Estudios Mayas, Madrid.

Ishihara, Reiko

2007 Bridging the Chasm between Religion and Politics: Archaeological Investigations of the Grietas at the Late Classic Maya Site of Aguateca, Peten, Guatemala. Unpublished Ph.D. dissertation, University of California, Riverside.

2008 Rising Clouds, Blowing Winds: Late Classic Maya Rain Rituals in the Main Chasm, Aguateca, Guatemala. *World Archaeology* 40(2):169–189.

Jones, Christopher, and Linton Satterthwaite

1982 *The Monuments and Inscriptions of Tikal: The Carved Monuments*. Tikal Report No. 33, Part A. University Museum Monograph No. 44. University of Pennsylvania, Philadelphia.

Joyce, Rosemary

1993 Women's Work: Images of Production and Reproduction in Pre-Hispanic Southern Central America. *Current Anthropology* 34:255–274.

Just, Bryan R.

2012 *Dancing into Dreams: Maya Vase Painting of the Ik' Kingdom*. Princeton University Press, Princeton.

Kaneko, Akira

2003 *Artefactos líticos de Yaxchilán*. Instituto Nacional de Antropología e Historia, Mexico City.

Keller, Angela

2008 Chan Shell Collection: Creating Identity with Shell. Paper presented at the 73rd Annual Meeting of the Society for American Archaeology, Vancouver, B.C.

Kelley, David H.

1976 *Deciphering the Maya Script*. University of Texas Press, Austin.

Keochakian, S.

2001 *Adhesive Materials Used on Pyrite Mirrors from Aguateca*. Report presented to the Museum Conservation Institute, Smithsonian Institution, Suitland, Maryland.

Kerr, Barbara, and Justin Kerr

2005 The Way of God L: The Princeton Vase Revisited. *Princeton University Art Museum Record* 64:71–80.

Kerr, Justin

2011 A Fishy Story: The Story of the Hero Twins as Catfish. Foundation for the Advancement of Mesoamerican Studies. http://www.famsi.org/research/kerr/articles/fishy_story/index.html.

Kesler, Stephen E., and Raul Ascarrunz-K.

1973 Lead-Zinc Mineralization in Carbonate Rocks, Central Guatemala. *Economic Geology* 68:1263–1274.

Kidder, Alfred. V.

1947 *The Artifacts of Uaxactun, Guatemala*. Publication No. 576. Carnegie Institution of Washington, Washington, D.C.

Kidder, Alfred V., Jesse D. Jennings, and Edwin M. Shook

1946 *Excavations at Kaminaljuyu, Guatemala*. Carnegie Institution of Washington, Washington, D.C.

Kovacevich, Brigitte

2006 Reconstructing Classic Maya Economic Systems: Production and Exchange at Cancuen, Guatemala. Unpublished Ph.D. dissertation, Vanderbilt University, Nashville, Tennessee.

Kovacevich, Brigitte, Duncan Cook, and Timothy Beach

2004 Areas de actividad doméstica en Cancuen: Perspectivas basadas en datos líticos y geo-químicos. In *XVII Simposio de Investigaciones Arqueológicas en Guatemala, 2003*, edited by Juan Pedro Laporte, Bárbara Arroyo, Héctor L. Escobedo, and Héctor E. Mejía, pp. 897–905. Ministerio de Cultura y Deportes, Instituto de Antropología e Historia, Asociación Tikal, Guatemala City.

Kubler, George

1977 *Aspects of Classic Maya Rulership on Two Inscribed Vessels*. Studies in Pre-Columbian Art and Archaeology No. 18. Dumbarton Oaks, Washington, D.C.

Laporte, Juan P.

1988 El Complejo Manik: Dos depósitos sellados, Grupo 6C-XVI, Tikal. In *Ensayos de alfarería prehispánica e histórica de Mesoamérica*, edited by Eduardo Noguera and Mari Carmen Serra Puehe, pp. 97–188. Instituto de Investigaciones Antropológicas, Universidad Nacional Autónoma de México, Mexico City.

Lee, David E.

2005 WK-06: Excavaciones en la Estructura L11-38, en el Complejo Palaciego Noroeste. In *Proyecto Arqueológico El Perú-Waka': Informe no. 2, temporada 2004*, edited by Héctor L. Escobedo and David Freidel, pp. 111–142. Report presented to the Instituto de Antropología e Historia, Guatemala City.

Lee, Thomas A., Jr.

1969 *The Artifacts of Chiapa de Corzo, Chiapas, Mexico*. Papers of the New World Archaeological Foundation No. 26. Brigham Young University, Provo, Utah.

Lentz, David L.

1990 *Acrocomia mexicana*: Palm of the Ancient Mesoamericans. *Journal of Ethnobiology* 10:183–194.

1991 Maya Diets of the Rich and Poor: Paleoethnobotanical Evidence from Copan. *Latin American Antiquity* 2(3):269–287.

1999 Plant Resources of the Ancient Maya: The Paleoethnobotanical Evidence. In *Reconstructing Ancient Maya Diet*, edited by Christine D. White, pp. 3–18. University of Utah Press, Salt Lake City.

Lentz, David L., Maria L. R. de Aguilar, Raul Villacorta, and Helen Marini

1996 *Trachypogon plumosus* (Poaceae, Andropogoneae): Ancient Thatch and More from the Cerén Site, El Salvador. *Economic Botany* 50(1):108–114.

Lentz, David L., Marilyn P. Beaudry-Corbett, Maria L. R. d. Aguilar, and Lawrence Kaplan

1996 Foodstuffs, Forests, Fields, and Shelter: A Paleoethnobotanical Analysis of Vessel Contents from the Ceren Site, El Salvador. *Latin American Antiquity* 7(3):247–262.

Lentz, David L., and Ruth Dickau

2005 *Seeds of Central America and Southern Mexico: The Economic Species*. Memoirs of the New York Botanical Garden, Vol. 91. New York Botanical Garden Press, Bronx.

Lentz, David L., and Brian Hockaday

2009 Tikal Timbers and Temples: Ancient Maya Agroforestry and the End of Time. *Journal of Archaeological Science* 36(7):1342–1353.

Lentz, David L., and Carlos R. Ramírez-Sosa

2002 Cerén Plant Resources: Abundance and Diversity. In *Before the Volcano Erupted: The Cerén Village in Central America*, edited by Payson D. Sheets, pp. 33–42. University of Texas Press, Austin.

Lentz, David L., Carlos R. Ramírez, and Bronson W. Griscom

1997 Formative-Period Subsistence and Forest-Product Extraction at the Yarumela Site, Honduras. *Ancient Mesoamerica* 8(1):63.

Lentz, David L., Jason Yaeger, Cynthia Robin, and Wendy Ashmore

2005 Pine, Prestige and Politics of the Late Classic Maya at Xunantunich, Belize. *Antiquity* 79(305):573–585.

Looper, Matthew G.

2009 *To Be Like Gods: Dances in Ancient Maya Civilization*. University of Texas Press, Austin.

López Varela, Sandra, Annelou van Gijn, and Loe Jacobs
2002 De-mystifying Pottery Production in the Maya Lowlands: Detection of Traces of Use-Wear on Pottery Sherds through Microscopic Analysis and Experimental Replication. *Journal of Archaeological Science* 29(10):1133–1147.

Lothrop, Joy M.
1992 Textiles. In *Artifacts from the Cenote of Sacrifice, Chichen Itza, Yucatan*, Vol. 10, edited by Clemency C. Coggins, pp. 33–90. Harvard University Press, Cambridge.

Lubin, George
1982 *Handbook of Composites.* Van Nostrand Reinhold, New York.

Luganov, V. A., and V. I. Shabalin
1982 Behavior of Pyrite during Heating. *Canadian Metallurgical Quarterly* 21:157–162.

Luke, Christina
2008 Carving Luxury: Late Classic White Stone Vase Traditions in Mesoamerica. In *New Approaches to Old Stone: Recent Studies of Ground Stone Artifacts*, edited by Yorke M. Rowan and Jennie R. Ebling, pp. 298–319. Equinox, London.

Lyman, R. Lee, and G. L. Fox
1989 A Critical Evaluation of Bone Weathering as an Indication of Bone Assemblage Formation. *Journal of Archaeological Science* 16:293–317.

Martin, Simon
1996 Tikal's "Star War" against Naranjo. In *Eighth Palenque Round Table, 1993*, edited by Martha J. Macri and Jan McHargue, pp. 223–236. Pre-Columbian Art Research Institute, San Francisco.
2001 Court and Realm: Architectural Signatures in the Classic Maya Southern Lowlands. In *Royal Courts of the Ancient Maya, Volume 1: Theory, Comparison, and Synthesis*, edited by Takeshi Inomata and Stephen D. Houston, pp. 168–194. Westview Press, Boulder, Colorado.

Martin, Simon, and Nikolai Grube
2008 *Chronicle of the Maya Kings and Queens: Deciphering the Dynastics of the Classic Maya.* 2nd ed. Thames and Hudson, London.

Martin, Simon, and Joel Skidmore
2012 Exploring the 584286 Correlation between the Maya and European Calendars. *PARI Journal* 13(2):3–16.

Masson, Marilyn A.
1995 Community Feasting Rituals and Postclassic Maya Village Political Structure: Evidence from Archaeofaunal Remains. Paper presented at the 60th Annual Meeting of the Society for American Archaeology, Minneapolis.
1999a Animal Resource Manipulation in Ritual and Domestic Contexts at Postclassic Maya Communities. *World Archaeology* 31(1):93–120.
1999b Postclassic Maya Communities at Progresso Lagoon and Laguna Seca, Northern Belize. *Journal of Field Archaeology* 25:285–306.
2008 Animal Use at the Postclassic Maya Center of Mayapán. *Quaternary International* 191(1):170–183.

Mayer, Karl Herbert
2002 An Unprovenanced Maya Stone Phallus. *Mexicon* XXIX(4):94–96.
2012 Two Maya Stone Phalli from Santa Elena, Yucatán, Mexico. *Mexicon* XXXIV(2):32–33.

McAnany, Patricia A.
1995 *Living with the Ancestors: Kinship and Kingship in Ancient Maya Society.* University of Texas Press, Austin.

McAnany, Patricia A., and Shannon Plank
2001 Perspectives on Actors, Gender Roles, and Architecture at Classic Maya Courts and Households. In *Royal Courts of the Ancient Maya, Volume 1: Theory, Comparison, and Synthesis,* edited by Takeshi Inomata and Stephen D. Houston, pp. 84–129. Westview Press, Boulder, Colorado.

McCutcheon, P. T.
1992 Burned Archaeological Bone. In *Deciphering a Shell Midden*, edited by Julie K. Stein, pp. 347–370. Academic Press, San Diego.

McKillop, Heather
1994 Ancient Maya Tree Cropping. *Ancient Mesoamerica* 5: 129–140.

McVaugh, Rogers
1963 *Flora of Guatemala.* Chicago Natural History Museum, Chicago.

Miksicek, Charles
1991 The Ecology and Economy of Cuello. In *Cuello: An Early Maya Community in Belize*, edited by Norman Hammond, pp. 70–84. Harvard University Press, Cambridge.

Milbrath, Susan
1999 *Star Gods of the Maya: Astronomy in Art, Folklore, and Calendars*. University of Texas Press, Austin.

Miller, Arthur G.
1973 *The Mural Painting of Teotihuacan*. Dumbarton Oaks Research Library and Collections, Washington, D.C.

Miller, Mary E.
1986 Copan: Conference with a Perished City. In *City-States of the Maya: Art and Architecture*, edited by Elizabeth Benson, pp. 72–109. Rocky Mountain Institute for Pre-Columbian Studies, Denver.

Miller, Mary E., and Simon Martin
2004 *Courtly Art of the Ancient Maya.* Thames and Hudson, New York.

Miller, Mary E., and Karl A. Taube
1993 *The Gods and Symbols of Ancient Mexico and the Maya: An Illustrated Dictionary of Mesoamerican Religion.* Thames and Hudson, New York.

Mitchell, John D., and Scott A. Mori
1987 *The Cashew and Its Relatives (Anacardium: Anacardiaceae).* New York Botanical Garden, Bronx.

Moholy-Nagy, Hattula
1994 Tikal Material Culture: Artifacts and Social Structure at a Classic Lowland Maya City. Unpublished Ph.D. dissertation, University of Michigan, Ann Arbor.
2003a *The Artifacts of Tikal: Utilitarian Artifacts and Unworked Material.* Tikal Report No. 27, Part B. University Museum Monograph No. 118. University of Pennsylvania, Philadelphia.
2003b Source Attribution and the Utilization of Obsidian in the Maya Area. *Latin American Antiquity* 14:301–310.

Moholy-Nagy, Hattula, and John M. Ladd
1992 Objects of Stone, Shell, and Bone. In *Artifacts from the*

Cenote of Sacrifice, edited by Clemency C. Coggins, pp. 99–152. Memoirs of the Peabody Museum of Archaeology and Ethnology, Vol. 10, No. 3. Harvard University, Cambridge.

Morehart, Christopher T., Jaime J. Awe, Vanessa Owen, and Christopher G. Helmke

2004 Ancient Textile Remains from Barton Creek Cave, Cayo District, Belize. *Mexicon* 26:50–56.

Morehart, Chris T., David L. Lentz, and Keith M. Prufer

2005 Wood of the Gods: The Ritual Use of Pine (*Pinus* spp.) by the Ancient Lowland Maya. *Latin American Antiquity* 16(3):255–274.

Navarro, Laura, and Joaquin Arroyo-Cabrales

2013 Bats in Ancient Mesoamerica. In *Archaeology of Mesoamerican Animals*, edited by Christopher M. Götz and Kitty F. Emery. Lockwood Press, Atlanta.

Nelson, Zachary, Barry Scheetz, Guillermo Mata Amado, and Antonio Prado

2009 Composite Mirrors of the Ancient Maya: Ostentatious Production and Precolumbian Fraud. *PARI Journal* 9(4): 1–7.

Orellana, Sandra L.

1987 *Indian Medicine in Highland Guatemala: The Pre-Hispanic and Colonial Periods.* University of New Mexico Press, Albuquerque.

Pablo Aguilera, María del Mar de

1991 El arte de la piedra: Evolución y expresión. In *Oxkintok: Una ciudad maya de Yucatán*. Ministerio de Cultura, Dirección General de Bellas Artes y Archivos, Madrid.

Palka, Joel W.

2002 Left/Right Symbolism and the Body in Ancient Maya Iconography and Culture. *Latin American Antiquity* 13(4): 419–443.

Pendergast, David M.

1979 Lamanai 1979: Prolegomena to a Treatise on the Parameters of Euphoric Disorientation as a Measure of Disfunctional Complexity in the Tropical Ecosystemic Logistics/Excavation Interface. *Royal Ontario Museum Archaeological Newsletter, New Series*, 1–4.

1982 *Excavations at Altun Ha, Belize, 1964–1970.* Vol. 2. Royal Ontario Museum, Toronto.

1990 *Excavations at Altun Ha, Belize, 1964–1970, 3 (1990).* Royal Ontario Museum, Toronto.

2004 Where's the Meat? Maya Zooarchaeology from an Archaeological Perspective. In *Maya Zooarchaeology: New Directions in Method and Theory*, edited by Kitty F. Emery. Cotsen Institute of Archaeology, University of California, Los Angeles.

Perry, Jesse P.

1991 *The Pines of Mexico and Central America.* Timber Press, Portland, Oregon.

Petersen, Erich U., and Half Zantop

1980 The Oxec Deposit, Guatemala: An Ophiolite Copper Occurrence. *Economic Geology* 75:1053–1065.

Peterson, Jeanette Favrot

1980 *Precolumbian Flora and Fauna: Continuity of Plant and Animal Themes in Mesoamerican Art*. Mingei International Museum, San Diego.

Pillsbury, Joanne, Miriam Doutriaux, Reiko Ishihara-Brito, and Alexandre Tokovinine (editors)

2012 *Ancient Maya Art at Dumbarton Oaks*. Pre-Columbian Art at Dumbarton Oaks No. 4. Dumbarton Oaks Research Library and Collection, Washington, D.C.

Piña Chan, Román

1968 *Jaina, la casa en el agua.* Instituto Nacional de Antropología, Mexico City.

Pohl, Mary D.

1981 Ritual Continuity and Transformation in Mesoamerica: Reconstructing the Ancient Maya Cuch Ritual. *American Antiquity* 46:513–529.

1983 Maya Ritual Faunas: Vertebrate Remains from Burials, Caches, Caves, and Cenotes in the Maya Lowlands. In *Civilization in the Ancient Americas: Essays in Honor of Gordon R. Willey*, edited by Richard M. Leventhal and Alan L. Kolata, pp. 55–103. University of New Mexico Press, Albuquerque.

1985 The Privileges of Maya Elites: Prehistoric Vertebrate Fauna from Seibal. In *Prehistoric Lowland Maya Environment and Subsistence Economy*, edited by Mary D. Pohl, pp. 133–145. Papers of the Peabody Museum of Archaeology and Ethnology Vol. 77. Harvard University, Cambridge.

1990 Excavations at Seibal, Department of Peten, Guatemala: The Ethnozoology of the Maya: Faunal Remains from Five Sites in Peten, Guatemala. Memoirs of the Peabody Museum of Archaeology and Ethnology, Vol. 17, No. 3. Harvard University, Cambridge.

1994a The Economics and Politics of Maya Meat Eating. In *The Economic Anthropology of the State*, edited by Elizabeth M. Brumfiel. Monographs in Economic Anthropology No. 11. University Press of America, New York.

1994b Late Classic Maya Fauna from Settlement in the Copán Valley, Honduras: Assertion of Social Status through Animal Consumption. In *Ceramics and Artifacts from Excavations in the Copan Residential Zone*, edited by Gordon R. Willey, Richard M. Leventhal, Arthur A. Demarest, and William L. Fash, pp. 459–476. Papers of the Peabody Museum of Archaeology and Ethnology, Vol. 80. Harvard University, Cambridge.

Pohl, Mary D., and Lawrence H. Feldman

1982 The Traditional Role of Women and Animals in Lowland Maya Economy. In *Maya Subsistence*, edited by Kent Flannery, pp. 295–311. Academic Press, New York.

Pohl, Mary D., and John M. Pohl

1983 Ancient Maya Cave Rituals. *Archaeology* 36:28–32, 50–51.

Ponciano, Erick

2009 Estructura M7-22 del Grupo Palacio y la zona norte de Aguateca (Operaciones AG22C y AG28A). In *La política de lugares y comunidades en la antigua sociedad maya de Petexbatun: Las investigaciones del Proyecto Arqueológico Aguateca Segunda Fase*, edited by Takeshi Inomata, Daniela Triadan, Erick Ponciano, and Kazuo Aoyama, pp. 14–18. Ministerio de Cultura y Deportes, Dirección General del Patrimonio Cultural y Natural, and Instituto de Antropología e Historia, Guatemala City.

Ponciano, Erick, Takeshi Inomata, Estela Pinto, and Marco A. Monroy

2009 Excavaciones en la Plaza Principal: Estructuras L8-6

(Operación AG32A) y L8-7 (Operación AG33A). In *La política de lugares y comunidades en la antigua sociedad maya de Petexbatun: Las investigaciones del Proyecto Arqueológico Aguateca Segunda Fase*, edited by Takeshi Inomata, Daniela Triadan, Erick Ponciano, and Kazuo Aoyama, pp. 27–38. Ministerio de Cultura y Deportes, Dirección General del Patrimonio Cultural y Natural, and Instituto de Antropología e Historia, Guatemala City.

Ponciano, Erick, Takeshi Inomata, and Otto Román

2004 *Informe final del Proyecto de Restauración Segunda Fase*. Report presented to the Interamerican Development Bank and Instituto de Antropología e Historia, Guatemala City.

Ponciano, Erick, Takeshi Inomata, and Daniela Triadan (editors)

2006 *Informe del Proyecto Arqueológico Ceibal Petexbatun: La temporada del campo 2006.* Instituto de Antropología e Historia de Guatemala, Guatemala City.

Ponciano, Erick, Estela Pinto, Daniela Triadan, and Marco A. Monroy

2009 Excavaciones en el área de la Calzada: Estructuras M8-3 (Operación AG23B), M8-4 (Operación AG23A), y M8-8 (Operación AG20A). In *La política de lugares y comunidades en la antigua sociedad maya de Petexbatun: Las investigaciones del Proyecto Arqueológico Aguateca Segunda Fase*, edited by Takeshi Inomata, Daniela Triadan, Erick Ponciano, and Kazuo Aoyama, pp. 19–26. Ministerio de Cultura y Deportes, Dirección General del Patrimonio Cultural y Natural, and Instituto de Antropología e Historia, Guatemala City.

Popenoe, Wilson

1920 *Manual of Tropical and Subtropical Fruits, Excluding the Banana, Coconut, Pineapple, Citrus Fruits, Olive, and Fig.* Macmillan, New York.

Powis, Terry G.

2004 Ancient Lowland Maya Utilization of Freshwater Pearly Mussels (*Nephronaias* sp.). In *Maya Zooarchaeology: New Directions in Method and Theory*, edited by Kitty F. Emery. Cotsen Institute of Archaeology, University of California, Los Angeles.

Proskouriakoff, Tatiana

1963 Review of "The Art and Architecture of Ancient America: The Mexican, Maya, and Andean Peoples." *American Journal of Archaeology* 67(3):323–324.

1974 *Jades from the Cenote of Sacrifice, Chichen Itza, Yucatan.* Harvard University, Cambridge.

Pugh, Timothy W., and Prudence M. Rice

2009 Kowoj Ritual Performance and Social Representations at Zacpeten. In *The Kowoj: Identity, Migration, and Geopolitics in Late Postclassic Petén, Guatemala*, edited by Prudence M. Rice and Don S. Rice, pp. 141–172. University Press of Colorado, Boulder.

Puleston, Dennis E.

1977 The Art and Archaeology of Hydraulic Agriculture in the Maya Lowlands. In *Social Process in Maya Prehistory: Studies in Memory of Sir Eric Thompson*, edited by Norman Hammond, pp. 449–467. Academic Press, London.

Quitmyer, Irvy R.

2004 What Kind of Data Are in the Back Dirt? An Experiment on the Influence of Screen Size on Optimal Data Recovery. *Archaeofauna* 13:109–129.

Reents-Budet, Dorie

1994 *Painting the Maya Universe: Royal Ceramics of the Classic Period.* Duke University Press in association with Duke University Museum of Art, Durham, North Carolina.

Reents-Budet, Dorie J., Antonia Foias, Ronald L. Bishop, M. James Blackman, and Stanley P. Guenter

2007 Interacciones políticas y el sitio Ik' (Motul de San José): Datos de la cerámica. In *XX Simposio de Investigaciones Arqueológicas en Guatemala, 2006*, edited Juan Pedro Laporte, Barbara Arroyo, and Hector Mejía, pp. 1416–1436. Museo Nacional de Arqueología y Etnología, Guatemala City.

Reimer, P. J., et al.

2009 IntCal09 and Marine09 Radiocarbon Age Calibration Curves, 0–50,000 Years Cal BP. *Radiocarbon* 51(4):1111–1150.

Reina, Ruben E.

2011 Ruben E. Reina Papers. Database of the American Philosophical Society. http://amphilsoc.org/mole/view?docId=ead/Mss.Ms.Coll.67-ead.xml.

Reina, Ruben E., and Robert M. Hill

1978 *The Traditional Pottery of Guatemala.* University of Texas Press, Austin.

1980 Lowland Maya Subsistence: Notes from Ethnohistory and Ethnography. *American Antiquity* 45(1):74–79.

Reitz, Elizabeth J., and Elizabeth S. Wing

1999 *Zooarchaeology*. Cambridge Manuals in Archaeology. Cambridge University Press, New York.

Rice, Prudence M.

1987 *Pottery Analysis: A Sourcebook.* University of Chicago Press, Chicago.

Richter, J.

1986 Experimental Study of Heat Induced Morphological Changes in Fish Bone Collagen. *Journal of Archaeological Science* 13(5):477–481.

Ricketson, Oliver G.,

1929 *Excavations at Baking Pot, British Honduras.* Carnegie Institution of Washington, Washington, D.C.

Ricketson, Oliver G., and Edith B. Ricketson

1937 *Uaxactun, Guatemala. Group E—1926–1931.* Publication No. 477. Carnegie Institution of Washington, Washington, D.C.

Riese, Berthold

1984 Eine Alabasterschale mit Maya-Inschrift aus La Florida de Copán, Honduras. *Archiv für Völkerkunde* 38:13–16.

Ringle, William M., and George J. Bey III

2001 Post-Classic and Terminal Classic Courts of the Northern Maya Lowlands. In *Royal Courts of the Ancient Maya, Volume 2: Data and Case Study*, edited by Takeshi Inomata and Stephen D. Houston, pp. 266–307. Westview Press, Boulder, Colorado.

Robertson, Merle G.

1985 57 Varieties: The Palenque Beauty Salon. In *Fourth Palenque Round Table, 1980*, edited by Elizabeth P. Benson, pp. 29–44. Pre-Columbian Art Research Institute, San Francisco.

Ruscheinsky, Lynn M.

2003 The Social Reproduction of Gender Identity through the Production and Reception of Lowland Maya Figurines. Unpublished Ph.D. dissertation, University of British Columbia, Vancouver.

Ruz Lhuillier, A.

1954 Uxmal: Temporada de trabajos 1951–1952. *Anales del Instituto Nacional de Antropología e Historia* 6(34):49–67.

1958 Exploraciones arqueológicas en Palenque: 1954. *Anales del Museo Nacional de Arqueología, Historia, y Etnología* X:117–184.

1973 *El Templo de las Inscripciones.* Instituto Nacional de Antropología e Historia, Mexico City.

Sabloff, Jeremy A.

1975 *Excavations at Seibal, Department of Peten, Guatemala: Ceramics.* Memoirs of the Peabody Museum of Archaeology and Ethnology, Vol. 13, No. 2. Harvard University, Cambridge.

Sanders, William T.

1960 *Prehistoric Ceramics and Settlement Patterns in Quintana Roo, Mexico.* Carnegie Institution of Washington, Washington, D.C.

Sanders, William T., and David Webster

1988 The Mesoamerican Urban Tradition. *American Anthropologist* 90(3):546.

Saunders, Nicholas J.

1994 Tezcatlipoca: Jaguar Metaphors and the Aztec Mirror of Nature. In *Signifying Animals: Human Meaning in the Natural World*, edited by Roy G. Willis, pp. 159–177. One World Archaeology No. 16. Routledge, London.

1998 Architecture of Symbolism: The Feline Image. In *Icons of Power: Feline Symbolism in the Americas*, edited by Nicholas J. Saunders, pp. 12–52. Routledge, London.

Schele, Linda

1991 Inscripciones en la región de La Entrada, Honduras. In *Investigaciones arqueológicas en la región de La Entrada*, edited by Seiichi Nakamura, Kazuo Aoyama, and Eiji Uratsuji, pp. 213–217. Servicio de Voluntarios Japoneses para la Cooperación con el Extranjero, Instituto Hondureño de Antropología e Historia, San Pedro Sula, Honduras.

Schele, Linda, and Mary E. Miller

1986 *The Blood of Kings: Dynasty and Ritual in Maya Art.* Kimbell Art Museum, Fort Worth, Texas.

Scherer, Andrew K., and Charles Golden

2009 Tecolote, Guatemala: Archaeological Evidence for a Fortified Late Classic Maya Political Border. *Journal of Field Archaeology* 34(3):285–305.

Schlosser, Ann L.

1978 Classic Maya Lowland Figurine Development with Special Reference to Piedras Negras, Guatemala. Unpublished Ph.D. dissertation, Southern Illinois University, Carbondale.

Seler, Eduard, and Walter Lehmann

1901 *Grammatik der Maya Stämme: Kolleg von Prof. Seler.* Berlin.

Sharpe, Ashley

2011 Beyond Capitals and Kings: A Comparison of Animal Resource Use among Ten Late Classic Maya Sites. Unpublished Master's thesis, University of Florida, Gainesville.

Shaw, Leslie C.

1991 The Articulation of Social Inequality and Faunal Resource Use in the Preclassic Community of Colha, Northern Belize. Unpublished Ph.D. dissertation, University of Massachusetts, Amherst.

1999 Social and Ecological Aspects of Preclassic Maya Meat Consumption at Colha, Belize. In *Reconstructing Ancient Maya Diet*, edited by C. White, pp. 83–102. University of Utah Press, Salt Lake City.

Sheets, Payson D.

1992 *The Ceren Site: A Prehistoric Village Buried by Volcanic Ash in Central America.* Harcourt Brace Jovanovich, Fort Worth, Texas.

2002 *Before the Volcano Erupted: The Ancient Cerèn Village in Central America.* University of Texas Press, Austin.

Shepard, Anna O.

1948 *Plumbate: A Mesoamerican Trade Ware.* Publication No. 573. Carnegie Institution of Washington, Washington, D.C.

Shipman, Pat, Foster Giraud, and Margaret J. Schoeninger

1984 Burnt Bones and Teeth: An Experimental Study of Color, Morphology, Crystal Structure and Shrinkage. *Journal of Archaeological Science* 11:307–325.

Shook, Edwin M.

1947 Guatemala Highlands. In *Year Book No. 46*, pp. 179–184. Carnegie Institution of Washington, Washington, D.C.

1954 *The Temple of Kukulgan at Mayapan.* Current Reports No. 20. Carnegie Institution of Washington, Department of Archaeology, Washington, D.C.

Shook, Edwin M., and William N. Irving

1955 *Colonnaded Buildings at Mayapan.* Current Reports No. 22. Carnegie Institution of Washington, Department of Archaeology, Washington, D.C.

Shook, Edwin M., and Alfred V. Kidder

1961 The Painted Tomb at Tikal. *Expedition* 4(1):2–7.

Simmons, Scott E., and Payson Sheets

2002 Divination at Cerén: The Evidence from Structure 12. In *Before the Volcano Erupted: The Ancient Cerèn Village in Central America*, edited by Payson Sheets, pp. 104–113. University of Texas Press, Austin.

Smith, A. Ledyard, and Alfred V. Kidder

1943 *Explorations in the Motagua Valley, Guatemala.* Contributions to American Anthropology and History, Vol. VIII, No. 41. Publication No. 546. Carnegie Institution of Washington, Washington, D.C.

1951 *Excavations at Nebaj, Guatemala.* Publication No. 594. Carnegie Institution of Washington, Washington, D.C.

Smith, Robert E.

1955 *Ceramic Sequence at Uaxactun, Guatemala.* Middle American Research Institute, Tulane University, New Orleans.

Smyth, Michael P.

1991 *Modern Maya Storage Behavior: Ethnoarchaeological Case Examples from the Puuc Region of Yucatan; Comportamiento de almacenaje entre los mayas modernos: Estudios etnoarqueológicos de la región Puuc de Yucatán.* Department of Anthropology, University of Pittsburgh, Pittsburgh.

Solis, Wendy
2010 Ancient Maya Exploitation of the Jute (*Pachychils* spp.) at the Site of Minanha, West Central Belize. Unpublished Master's thesis, Trent University, Peterborough, Ontario.

Spink, Mary L.
1983 Metates as Socioeconomic Indicators during the Classic Period at Copan, Honduras. Unpublished Ph.D. dissertation, Pennsylvania State University, University Park.

Squier, Ephraim G.
1869 Tongues from Tombs; or, The Stories That Graves Tell. *Frank Leslie's Illustrated Newspaper* 28(6):269–270.

Stahl, Peter W.
1995 Differential Preservation Histories Affecting the Mammalian Zooarchaeological Record from the Forested Neotropical Lowlands. In *Archaeology in the Lowland American Tropics: Current Analytical Methods and Applications*, edited by Peter W. Stahl, pp. 154–180. Cambridge University Press, Cambridge.

Stanchly, Norbert
2004 Picks and Stones May Break My Bones: Taphonomy and Maya Zooarchaeology. In *Maya Zooarchaeology: New Directions in Method and Theory*, edited by K. F. Emery. Cotsen Institute of Archaeology, University of California, Los Angeles.
2007 Postclassic Maya Ritual Fauna Use at Lamanai, Belize: Interpreting the Faunal Assemblage from Structure N10-10. Paper presented at the 72nd Annual Meeting of the Society for American Archaeology, Austin, Texas.

Standley, Paul C., and Julian A. Steyermark
1946a *Flora of Guatemala, Part 4.* Chicago Natural History Museum, Chicago.
1946b *Flora of Guatemala, Part 5.* Chicago Natural History Museum, Chicago.
1949 *Flora of Guatemala, Part 6.* Chicago Natural History Museum, Chicago.
1958 *Flora of Guatemala, Part 1.* Chicago Natural History Museum, Chicago.

Standley, Paul C., and Louis O. Williams
1961 *Flora of Guatemala, Part 7(1).* Chicago Natural History Museum, Chicago.
1967 *Flora of Guatemala, Part 8(3).* Chicago Natural History Museum, Chicago.
1970 *Flora of Guatemala, Part 9 (1–2).* Chicago Natural History Museum, Chicago.

Stöckli, Matthias
2007 Playing Music as a Domestic Activity? Interpretations of the Finds of Sound-Producing Artifacts at Aguateca, El Peten, Guatemala. *World of Music* 49(2):17–34.

Stone, Andrea J.
1995 *Images from the Underworld: Naj Tunich and the Tradition of Maya Cave Painting.* University of Texas Press, Austin.

Stuart, David
2000 "The Arrival of Strangers": Teotihuacan and Tollan in Classic Maya History. In *Mesoamerica's Classic Heritage: From Teotihuacan to the Aztecs*, edited by Davíd Carrasco, Lindsay Jones, and Scott Sessions, pp. 465–513. University Press of Colorado, Boulder.
2006 *The Inscriptions from Temple XIX at Palenque: A Commentary*. Pre-Columbian Art Research Institute, San Francisco.

Stuart, David, and Stephen D. Houston
1994 *Classic Maya Place Names*. Studies in Pre-Columbian Art and Archaeology No. 33. Dumbarton Oaks, Washington, D.C.

Stuart, David, and George Stuart
2008 *Palenque: Eternal City of the Maya*. Thames and Hudson, London.

Szpak, Paul
2011 Fish Bone Chemistry and Ultrastructure: Implications for Taphonomy and Stable Isotope Analysis. *Journal of Archaeological Science* 38(12):3358–3372.

Taschek, Jennifer T.
1994 *The Artifacts of Dzibilchaltun, Yucatan, Mexico: Shell, Polished Stone, Bone, Wood, and Ceramics*. Middle American Research Institute Publication No. 50. Tulane University, New Orleans.

Taube, Karl A.
1983 The Teotihuacan Spider Woman. *Journal of Latin American Lore* 9(2):107–189.
1988 The Ancient Yucatec New Year Festival: The Liminal Period in Maya Ritual and Cosmology. Unpublished Ph.D. dissertation, Yale University, New Haven.
1992a The Iconography of Mirrors at Teotihuacan. In *Art, Ideology, and the City of Teotihuacan*, edited by Janet C. Berlo, pp. 169–204. Dumbarton Oaks Research Library and Collection, Washington, D.C.
1992b *The Major Gods of Ancient Yucatan*. Studies in Pre-Columbian Art and Archaeology No. 32. Dumbarton Oaks Research Library and Collection, Washington, D.C.
1997 A God Named Zip. *Archaeology* 50:39.
2003 Ancient and Contemporary Maya Conceptions about Forest and Field. In *The Lowlands Maya Area: Three Millennia at the Human-Wildland Interface*, edited by Arturo Gomez-Pompa, M. F. Allen, Scott L. Fedick, and J. J. Jiménez-Osornio, pp. 461–492. Food Products Press, New York.
2005 The Symbolism of Jade in Classic Maya Religion. *Ancient Mesoamerica* 16(1):23–50.
2010 Where Earth and Sky Meet: The Sea in Ancient and Contemporary Maya Cosmology. In *Fiery Pool: The Maya and the Mythic Sea*, edited by Daniel Finamore and Stephen D. Houston, pp. 202–219. Peabody Essex Museum, Salem, Massachusetts.

Tedlock, Dennis
1996 *Popol Vuh: The Mayan Book of the Dawn of Life.* Simon and Schuster, New York.

Teeter, Wendy G.
2001 Animal Utilization in a Growing City: Vertebrate Exploitation at Caracol, Belize. Unpublished Ph.D. dissertation, University of California, Los Angeles.
2004 Animal Utilization in a Growing City: Vertebrate Exploitation at Caracol, Belize. In *Maya Zooarchaeology: New Directions in Method and Theory*, edited by Kitty F. Emery, pp. 177–192. Cotsen Institute of Archaeology, University of California, Los Angeles.

Teeter, Wendy G., and Arlen F. Chase

2004 Adding Flesh to Bones: Using Zooarchaeological Research to Answer the Big-Picture Questions. *Archaeofauna* 13: 155–172.

Terry, Richard E., Fabian G. Fernández, J. J. Parnell, and Takeshi Inomata

2004 The Story in the Floors: Chemical Signatures of Ancient and Modern Maya Activities at Aguateca, Guatemala. *Journal of Archaeological Science* 31:1237–1250.

Thompson, J. Eric S.

1931 *Archaeological Investigations in the Southern Cayo District, British Honduras*. Anthropological Series, Vol. 17, No. 3. Field Museum of Natural History, Chicago.

1939 *Excavations at San José, British Honduras*. Publication No. 506. Carnegie Institution of Washington, Washington, D.C.

1954 *A Presumed Residence of the Nobility at Mayapan*. Current Reports No. 19. Carnegie Institution of Washington, Department of Archaeology, Washington, D.C.

Thornton, Erin Kennedy

2012 Animal Resource Use and Exchange at an Inland Maya Port: Zooarchaeological Investigations at Trinidad de Nosotros. In *Motul de San José: Politics, History, and Economy in a Classic Maya Polity*, edited by Antonia Foias and Kitty F. Emery, pp. 326–356. University Press of Florida, Gainesville.

Thurston, Elizabeth

2010 Crocodiles and the Ancient Maya: A Consolidated Examination of the Iconographic and Zooarchaeological Data. Master's thesis, Trent University, Peterborough, Ontario.

Tokovinine, Alexandre, and Marc Zender

2012 Lords of the Windy Water: The Royal Court of Motul de San José in Classic Maya Inscriptions. In *Motul de San José: Politics, History, and Economy in a Classic Maya Polity*, ed. Antonia E. Foias and Kitty F. Emery, pp. 30–66. University Press of Florida, Gainesville.

Tomasic, John J.

2012 Donut Stones as Thigh-Supported Spindle Whorls: Evidence of Ancient Maya Household Yarn and Cordage Production. *Latin American Antiquity* 23:215–228.

Tonoike, Yukiko

2001 The Volume of Vessels at Aguateca: Implications for Vessel Function and Household Composition. Master's thesis, Yale University, New Haven.

Tourtellot, Gair, III

1988 Developmental Cycles of Households and Houses at Seibal. In *Household and Community in the Mesoamerican Past*, edited by Richard R. Wilk and Wendy Ashmore, pp. 97–120. University of New Mexico Press, Albuquerque.

Tourtellot, Gair, III, Jeremy A. Sabloff, and Michael P. Smyth

1990 Room Counts and Population Estimation for Terminal Classic Sayil in the Puuc Region, Yucatan, Mexico. In *Precolumbian Population History in the Maya Lowlands*, edited by T. P. Culbert and Don S. Rice, pp. 245–262. University of New Mexico Press, Albuquerque.

Tovalín Ahumada, Alejandro, J. Adolfo Velázquez de León Collins, and Victor M. Ortíz Villareal

1999 Cuenco de alabastro con decoración incisa prodedente de Bonampak. *Mexicon* 21(4):75–80.

Tozzer, Alfred M.

1941 *Landa's Relación de las cosas de Yucatan: A Translation.* Papers of the Peabody Museum of Archaeology and Ethnology Vol. 18. Harvard University, Cambridge.

Tozzer, Alfred M., and Glover M. Allen

1910 *Animal Figures in the Maya Codices*. Papers of the Peabody Museum of Archaeology and Ethnology, Vol. 4, No. 3. Harvard University, Cambridge.

Triadan, Daniela

2000 Elite Household Subsistence at Aguateca, Guatemala. *Mayab* 13:46–56.

2006a Late Classic Male Figurines and Their Social Context. Paper presented at the 71st Annual Meeting of the Society for American Archaeology, San Juan, Puerto Rico.

2006b Five Fine Gray Pottery Bells from Aguateca, Guatemala. *Mexicon* 28:75–78.

2007 Warriors, Nobles, Commoners, and Beasts: Figurines from Elite Buildings at Aguateca, Guatemala. *Latin American Antiquity* 18(3):269–294.

Triadan, Daniela, Erick Ponciano, and Takeshi Inomata

2009 Excavaciones en un grupo residencial no-elitista de Aguateca: Grupo M6-3 (Operación AG29). In *La política de lugares y comunidades en la antigua sociedad maya de Petexbatun: Las investigaciones del Proyecto Arqueológico Aguateca Segunda Fase*, edited by Takeshi Inomata, Daniela Triadan, Erick Ponciano, and Kazuo Aoyama, pp. 19–50. Ministerio de Cultura y Deportes, Dirección General del Patrimonio Cultural y Natural, and Instituto de Antropología e Historia, Guatemala City.

Turner, B. L., II

1990 Population Reconstruction for the Central Maya Lowlands. In *Precolumbian Population History in the Maya Lowlands*, edited by T. Patrick Culbert and Don S. Rice, pp. 301–324. University of New Mexico Press, Albuquerque.

Urquizú, Mónica

1999 Estructura M7-26. In *Informe anual del Proyecto de Restauración Aguateca, enero–diciembre 1999*, edited by Juan A. Valdés, Mónica Urquizú, Carolina Díaz-Samayoa, and Horacio Martínez Pais, pp. 6–10. Instituto de Antropología e Historia de Guatemala, Programa de Desarrollo Sostenible de Petén, BID-IDAEH, Guatemala City.

Vail, Gabrielle

1997 The Deer-Trapping Almanacs in the Madrid Codex. In *Papers on the Madrid Codex*, edited by Victoria R. Bricker and Gabrielle Vail, pp. 73–110. Publication No. 64. Middle American Research Institute, Tulane University, New Orleans.

Valadez Azúa, R., A. Blanco Padilla, et al.

2013 The Dog in the Mexican Archaeozoological Record. In *The Archaeology of Mesoamerican Animals*, edited by Christopher M. Götz and Kitty F. Emery. Lockwood Press, Atlanta.

Valdés, Juan Antonio
1997 Tamarindito: Archaeology and Regional Politics in the Petexbatun Region. *Ancient Mesoamerica* 8(2):321–335.

Valdés, Juan A., M. Urquizú, C. Díaz Samayoa, and H. Martínez Paíz
1999 *Informe anual del Proyecto de Restauración Aguateca.* Report presented to the Instituto de Antropología e Historia de Guatemala, Guatemala City.

Valdés, Juan A., Mónica Urquizú, Horacio Martínez, and Carolina Díaz-Samayoa
2001 Lo que expresan las figurillas de Aguateca acerca del hombre y los animales. In *XIV Simposio de Investigaciones Arqueológicas en Guatemala, 2000*, edited by Juan P. Laporte and Héctor Escobedo, pp. 761–787. Museo Nacional de Arqueología, Guatemala City.

van der Merwe, Nikolaas J., Robert H. Tykot, Norman Hammond, and Kim Oakberg
2000 Diet and Animal Husbandry of the Preclassic Maya at Cuello Belize: Isotopic and Zooarchaeological Evidence. In *Biogeochemical Approaches to Paleodietary Analysis*, edited by M. Anne Katzenberg and Stanley H. Ambrose, pp. 23–38. Kluwer Academic/Plenum, New York.

Van Tuerenhout, Dirk
1996 Rural Fortifications at Quim Chi Hilan, El Peten, Guatemala: Late Classic Maya Social Change Seen from a Small Site Perspective. Unpublished Ph.D. dissertation, Tulane University, New Orleans.

Velásquez García, Erik
2007 La máscara de "rayos X": Historia de un artilugio iconográfico en el arte maya. *Anales del Instituto de Investigaciones Estéticas* 90:7–36.
2009 Los señores de la entidad política de Ik'. *Estudios de Cultura Maya* 34:43–90.

Vogt, Evon Z.
1969 *Zinacantán: A Maya Community in the Highlands of Chiapas.* Belknap Press of Harvard University Press, Cambridge.

Wagley, Charles
1949 *The Social Religious Life of a Guatemalan Village*. Memoir No. 71. American Anthropological Association, Menasha, Wisconsin.

Webster, David
1979 *Cuca, Chacchob, Dzonot Ake: Three Walled Northern Maya Centers.* Department of Anthropology. Pennsylvania State University, University Park.
1989 *The House of the Bacabs, Copan, Honduras*. Studies in Pre-Columbian Art and Archaeology, Vol. 29. Dumbarton Oaks Research Library and Collection, Washington, D.C.
2001 Spatial Dimensions of Maya Courtly Life: Problems and Issues. In *Royal Courts of the Ancient Maya, Volume 1: Theory, Comparison, and Synthesis*, edited by Takeshi Inomata and Stephen D. Houston, pp. 130–167. Westview Press, Boulder, Colorado.

Webster, D., and A. Freter
1990 The Demography of Late Classic Copan. In *Precolumbian Population History in the Maya Lowlands*, edited by T. P. Culbert and D. S. Rice, pp. 37–61. University of New Mexico Press, Albuquerque.

White, Christine D., Mary D. Pohl, Henry P. Schwarcz, and Fred J. Longstaffe
2001 Isotopic Evidence for Maya Patterns of Deer and Dog Use at Preclassic Colha. *Journal of Archaeological Science* 28:89–107.

Wiesen, Anne, and David L. Lentz
1999 Floral Remains from Cahal Pech and Surrounding Sites. In *Belize Valley Preclassic Maya Project*, Vol. 12, edited by Paul F. Healy and Jaime J. Awe, pp. 53–68. Trent University, Peterborough, Ontario.

Willey, Gordon R.
1972 *The Artifacts of Altar de Sacrificios.* Papers of the Peabody Museum of Archaeology and Ethnology Vol. 64, No. 1. Harvard University, Cambridge.
1977 The Rise of Maya Civilization: A Summary View. In *Origins of Maya Civilization*, edited by Richard E. W. Adams, pp. 383–423. University of New Mexico Press, Albuquerque.
1978 *Excavations at Seibal, Department of Peten, Guatemala: Artifacts.* Memoirs of the Peabody Museum of Archaeology and Ethnology, Vol. 14, No. 1. Harvard University, Cambridge.
1981 Maya Lowland Settlement Patterns: A Summary Review. In *Lowland Maya Settlement Patterns*, edited by Wendy Ashmore, pp. 385–415. University of New Mexico Press, Albuquerque.

Willey, Gordon R., William R. Bullard Jr., J. B. Glass, and James C. Gifford
1965 *Prehistoric Maya Settlements in the Belize Valley.* Papers of the Peabody Museum of Archaeology and Ethnology Vol. 54. Harvard University, Cambridge.

Willey, Gordon R., Richard M. Leventhal, and Arthur A. Demarest
1994 *Ceramics and Artifacts from Excavations in the Copan Residential Zone.* Papers of the Peabody Museum of Archaeology and Ethnology Vol. 80. Harvard University, Cambridge.

Williams, Louis O.
1981 *The Useful Plants of Central America.* Escuela Agrícola Panamericana, Tegucigalpa, Honduras.

Wing, Elizabeth S.
1978 Use of Dogs for Food: An Adaptation to the Coastal Environment. In *Prehistoric Coastal Adaptations: The Economy and Ecology of Maritime Middle America*, edited by Barbara L. Stark and Barbara Voorhies, pp. 29–41. Studies in Archaeology. Academic Press, New York.

Wiseman, Frederick M.
1978 Agricultural and Historical Ecology of the Maya Lowlands. In *Pre-Hispanic Maya Agriculture*, edited by Peter D. Harrison and B. L. Turner II, pp. 63–115. University of New Mexico Press, Albuquerque.

Woodbury, Richard B., and Aubrey S. Trik
1953 *The Ruins of Zaculeu, Guatemala.* Richmond, Virginia.

Woodfill, Brent K. S.
2007 Shrines of the Pasión-Verapaz Region, Guatemala: Ritual and Exchange along an Ancient Trade Route. Unpub-

lished Ph.D. dissertation, Vanderbilt University, Nashville, Tennessee.

Woodfill, Brent K. S., and Chloé Andrieu
2012 Tikal's Early Classic Domination of the Great Western Trade Route: Ceramic, Lithic, and Iconographic Evidence. *Ancient Mesoamerica* 23:189–209.

Wright, David R., Richard E. Terry, and M. Eberl
2009 Soil Properties and Stable Carbon Isotope Analysis of Landscape Features in the Petexbatún Region of Guatemala. *Geoarchaeology* 24(4):466–491.

Wright, Lori E.
1997 Biological Perspectives on the Collapse of the Pasion Maya. *Ancient Mesoamerica* 8(2):267.

Zamora Mejía, Marcelo
2002 La industria de la pirita en el sitio de Aguateca durante el período clásico tardío. Master's thesis, Universidad de San Carlos, Guatemala.

Zender, Marc
2010 *Baj* "Hammer" and Related Affective Verbs in Classic Mayan. *PARI Journal* 11(2):1–16.

Index

Actun Ch'on, 115
agave, 211
agouti and paca, 189, 191, 192, 193, 194–95
Aguateca: abandonment of, 327; burning of elite residences of, 327; defensive walls of, 325–26; downfall of, 325; Early Classic period at, 320, 322; early Late Classic period at, 322–23; emblem glyph of, 233, 266, 271; as exceptional site in terms of preservation, 201; feasting at, 182, 208, 212, 213, 312; final days as indicated by animal remains, 199–200; garbage disposal at, 314; household size at, 315; late Late Classic period at, 325–27; lives of the royal court at, 328–30; map of, 2, 3, 4, 5; map of area around, 321; Maya name of, 233; middle Late Classic period at, 323–25; Preclassic Period at, 320; relations with Tamarindito of, 237; setting of, 6; war as perpetual subject at, 330
Aguateca Archaeological Project, 1, 3–4, 6
Ajaw Bot, 235–36
alabaster vessels, 110–13, 258–61, 274, 275; effects of burning on, 93
alcoholic beverages, 209, 211, 213, 214
Altar de Sacrificios: carved bones from, 261; ceramic beads and rings from, 46; figurines from, 10; grooved objects from, 47; mirror backs from, 103; phallic object from, 115; pots from Ik' site from, 258; rasp from, 132; round disks with a hole from, 47; shell artifacts from, 141, 149, 154; spearthrower finger loops from, 155
Altar M, 234, 236, 325, 327
Altun Ha, 103, 132, 134, 149, 155
amphibians and reptiles, 186–87
animal remains: analysis methods of, 158–59; counts of, 163–64; distribution by structure of, 162–87; ritual and, 198; specialization and, 197–98; status and, 197; taxonomic list of, 160–62. *See also* specific animal name
annona, 206
antler artifacts, 127, 129, 131, 132, 175, 177, 182, 198
architectural style: Aguateca-style, 324; Pasión-style, 324
armadillo, 194
arrowhead, 212
arrowpoints, 318
Arroyo de Piedra, 125, 237, 250, 252, 322
artifact conservation, 216; approaches to, 217–20; for bone and shell, 226, 228; for ceramics, 220–24, 225; for stone and mineral materials, 224–26
avocado, 208

Bajlaj Chan K'awiil, 233, 250, 322, 323
Baking Pot, 103
bark beaters, 274, 289, 295, 296, 319
bark processing, 295, 296
Barranca Escondida: animal remains from, 183–84; Cliff Chasm at, 133–34; Early Classic period use of, 322; end in use of, 323–24; map of, 5; as ritual location, 322; sculptures at, 237–38, 250–55
Barton Creek Cave, 209
Barton Ramie, 103, 117
Bayak, 320
bean, 208
bells, 11, 34–35
birds, 161, 170, 171, 172, 178, 187, 193
Blue Creek, 327
Bonampak, 94, 258
bone artifacts: awls, 177, 179, 180, 181, 182; beveled objects, 129, 131; blanks, 173, 179, 180; carved, 134–35; 166, 173; classification of, 127, 129, 132–35, 141; condition of, 156, 157; debitage and preforms, 135, 141, 156, 175, 179, 180, 181; disks, 133–34, 180; distribution of, 128; fishhook, 180; flakers, 129; found in elite residences, 156; illustrations of, 136–40; imitation stingray spines on, 129, 166; needles, 127, 128, 129, 156; ornaments, 132; paintbrushes, 179; pectorals, 134–35; perforators, 166, 177, 179, 180, 181, 183; pins and awls, 127, 128, 129, 130; plaques, 166, 176, 177, 179; in rapidly abandoned structures, 274, 283, 293; rasps, 15, 132, 175, 177, 179; spatulas, 129, 131, 166, 177, 179, 180; thermal alteration of, 157; tubes, 132, 133, 177, 178, 179, 180, 181, 183; working of, 179, 282, 285, 296, 297, 298, 315, 327–28
brocket deer, 188, 189, 191, 192, 193, 196
Brown, Linda A., 198
Buechler, Jeff, 323, 326
burning: and abandonment, 162, 182; damage caused by, 166; during attack, 327; of structures, 200; temperature reached during, 327

cacao, 210, 211
Cahal Pech, 209, 213
calabash, 206
Calakmul, 328
Cancuen, 39, 47, 93, 103, 105
Caracol, 258, 329
cats, 193--94; distribution of, 170, 171, 172, 188–89, 190; possible use of skins of, 198; proportion of juvenile and left elements of, 192, 193

Ceibal: alabaster vessels from, 111; Early Classic period at, 320, 322; figurines from, 10; pectorals depicted at, 134; Preclassic period at, 320; rasp from, 132; relations with Aguateca of, 235–36; ring pendent depicted at, 149
ceramic artifacts: beads and rings, 45–46; drums, 14, 15, 273, 283, 285, 293, 312; grooved objects, 47, 48; other forms, 47–48; in rapidly abandoned structures, 273, 283, 285, 293, 312; rectangular disks, 46, 47, 48; round disks with hole, 46–47, 48; unfired clay, 48. *See also* spindle whorls; worked sherds
ceramic laminates: conservation of, 221, 224, 225; from Granada Group, 125; headdress of, 122, 123; from Structure M7-22, 123; from Structure M8-4, 124–25; from Structure M8-10, 125; manufacture of, 118–19; mask of, 120–21, 123; from other sites, 125–26; replication of, 119, 124; significance of, 126
ceramic types: Andres Red, 40, 327; Cambio/Encanto, 317, 318; Cambio/Pedregal, 43; Cambio Unslipped, 40, 43, 272, 316; Chablekal Fine Gray, 11; Chablekal Gray, 318, 326; Chaquiste Impressed, 40, 43, 316; Corozal, 43; Encanto Striated, 43, 316; Manteca Impressed, 212; Maru Incised, 327; Pantano Impressed, 211, 316, 318; Subin/Chaquiste, 41, 43, 317; Subin Red, 41, 272, 316; Tinaja/Pantano, 40, 42, 43, 317, 318; Tinaja Red, 272, 316
ceramic vessels: in rapidly abandoned structures, 272, 276, 282, 285, 287, 288, 295, 296, 297, 301, 302, 303, 307, 312, 316, 317
Cerén: divination with beans suggested at, 287; domestic groups at, 315; doughnut stones from, 76, 318; feasting at, 312; orchards at, 213–14; ritual paraphernalia at, 198; storage of maize at, 209
Cerro de Cheyo, 326
Cerros, 96
Chahk, 237, 262
Chiapa de Corzo, 258
Chichen Itza, 91, 93, 96, 103, 209, 258
chile pepper, 211
chipped stone tools: in rapidly abandoned structures, 274, 279, 285, 291, 300, 305, 310. *See also* obsidian
cohune palm, 212
copal, 206
Copan: alabaster vessel from, 111; carved bones from, 261; Pacific olive from, 185; palm cultivation at, 212, 213; pectorals depicted at, 134; sculpture at, 248, 259; shell pectorals from, 174
coral, 155
cotton, 209, 210
coyol, 212
Cuello, 206
Cueva de los Quetzales, 118, 125

dancing platform, 329
dogs, 187; counts of, 170, 171, 172; proportion in structure assemblages of, 188, 190; proportion of juveniles and left elements from, 192, 193; tooth beads from, 175, 182; use of skins of, 177, 187, 198
Dos Ceibas, 320, 321, 322, 323, 324, 325, 326
Dos Pilas: abandonment by elite of, 325; Aguateca-style structures at, 324; alabaster bowl from, 258; bone working at, 180; defeat by Calakmul of, 323; destruction of stela at, 324; foundation of Aguateca by, 6, 233; founded in early Late Classic period, 322; Hieroglyphic Stairway at, 250; middle Late Classic period at, 326; palm use at, 213; pectorals depicted at, 135; pots from Ik' at, 258; Squier Jade from, 262
doughnut stones, 75–76, 77, 78, 273, 285, 318–19
Dresden Codex, 248
Dzibilchaltun, 261, 262

El Abra, 258, 259
El Caribe, 235
elites: bone and shell artifacts in residences of, 156; burning of residences of, 327; gender division of space in residences of, 285, 289, 304; high-ranking males created central artifacts for, 329; possible dual residences at Dos Pilas and Aguateca of, 323; specialization in crafters for, 296
El Mirador, 322
El Perú, 93

faceted smoother, 287
fig, 209
figurines: animal, 12, 13, 15, 28–30, 32, 33; assemblage from Structure M8-8 of, 38; associated with females and children, 285, 318, 330; breakage of, 15; context of, 10, 14–15, 38; count of, 10; "fat man," 12, 16, 18, 29, 33; function of, 10–12, 15; hollow-head, 11–12, 36; human, 12, 13, 15, 16, 17–27, 31, 33; illustrations of, 16–38; large worked sherds possibly used in production of, 43, 306, 318; manufacture of, 10, 318; methods of analysis for, 9; molds for, 10, 14, 15, 16, 43, 273, 282, 285, 306, 318, 330; motifs of, 12, 13; musical instrument, 11, 15–16, 18–33; from rapidly abandoned structures, 273, 283, 285, 293, 295, 297, 298, 300, 302, 303, 308; solid, 17; vessel-shaped, 37
Finca El Paraiso, 11
fire: bone, as indicator of, 157; results of, 327
fish, 185–86
flat blocks, limestone, 76–77, 79–82
Foliated Scroll glyph, 323
food preparation: clusters of plant remains in areas for, 212; done by women, 285, 313, 318; evidence in rapidly abandoned structures for, 271, 285, 295, 296, 297, 298, 299, 300, 304, 306, 312, 313, 314, 315, 318; matching metates and manos in areas for, 75; no specialization in, 197; for royal family done outside main compound, 329
fossils, 116, 117

"G1"-K'awiil, 236
gender: division of space in elite households and, 285, 289, 304; left vs. right sides of multiroom buildings and, 314; less strict division of space in lower-status households by, 314, 318. *See also* women
Granada Group: animal remains from, 168, 170, 183, 185, 186, 187, 190, 193, 195, 197, 198, 199, 200; bone artifacts from, 128, 156; ceramic laminate from, 125; pigments from, 114; shell artifacts from, 142
greenstone: definition of, 84; distribution of, 274; as high status material, 94; ornaments, 86, 87, 89, 91, 95–96; in rapidly abandoned structures, 274, 282, 285, 295, 296, 304, 313; in termination ritual deposits, 94, 328
grinding tools. *See* manos; metates; mortars; palettes; pestles
guaje, 208

guava, 209

hematite, 114, 115
hide working, 176, 182, 295
huiscoyol, 212

Ik', 256, 257, 258
invertebrates, 160–61, 168–69, 184–85
Itzamnaaj K'awiil, 323

Jaina, 10
Jester God: headband, 92–93, 107–8, 275; ornament possibly representing, 88, 94

Kaminaljuyu, 103
K'awiil Chan K'inich, 325
Keochakian, S., 100–101

La Amelia, 235, 236, 237, 248
La Corona, 248, 259
Laguna de On, 186
Lamanai, 186
Lamaw Ek', 257–58
La Milpa, 205
Las Platiformas, 125
logwood, 207, 208
Los Quetzales, 196

Main Plaza: as focus of community events, 329; map of, 4; obsidian from, 326; stelae in, 237, 238–48
maize, 209, 210, 212
Maize God, 87, 89, 91
mamey, 210
manos, 54–55; distribution of, 55, 70; illustrations of, 66–69; matched to metates, 71, 72–75; preforms for, 67, 79, 83; in rapidly abandoned structures, 273, 295; types and materials of, 62–63
matapalo, 208
Maya: fruit trees grown adjacent to household groups by, 213; Lacondon, 213; large jars used by, 316; Tzotzil, 205–6, 208; use of basal molds by, 42; Yukatek, 209, 211
Maya Blue, 10, 26, 29, 30
Mayapan, 46, 132, 312
metates: basin, 55, 56–61, 64–65; decorated, 54, 55; distribution of, 55, 70–71, 75; flat, 55, 57, 59, 60, 64; matched with manos, 71, 72–75; in rapidly abandoned structures, 273, 285, 295, 297, 305, 306, 312; types and materials of, 54, 55
mirror backs: adhesives for, 100–101; context of, 101–2; data on, 104; illustrations of, 105, 106, 107, 108, 109; materials of, 103; recycling of, 108
mirrors: manufacture of, 107–8; pyrite mosaic pieces for, 98–100; reconstruction of, 107; use of, 105–6
monuments. *See* Altar M; stelae
mortars, 273, 275, 277, 285, 286, 289, 295
Motul de San José, 12, 185, 186

Nacemiento, 125, 322, 323
Naj Tunich, 115
nance, 208–9
Nebaj, 103
Nixtunchich, 115

obsidian, 326–27; distribution of, 274; in rapidly abandoned structures, 274, 278, 287, 290, 296, 299, 304, 306, 309
Oxkintok, 115

Pacbitun, 103
Palace Group and Causeway: animal remains from, 165, 168, 169, 170, 171, 181, 187, 188, 192, 197, 200; bone artifacts from, 128, 156, 157, 327; ceramic laminates from, 124–25, 126; ceramic vessels from, 272, 317; change in use of, 312; distribution of artifacts in, 273, 274, 312; doughnut stones from, 76; elite residences in, 325, 327; grinding tools from, 55, 74; large-scale theatrical events in, 329; map of, 3; pigments from, 114; pyrite artifacts from, 96; shell artifacts from, 142, 154; stone ornaments from, 85, 95. *See also* Structure M7-22, Structure M7-32
Palenque, 93, 103, 248, 258, 262
palettes, 155, 273, 275, 282, 286
patio groups, 315–16
peccaries, 188, 189, 190, 192, 193, 195
pendants, 86, 87, 91, 94, 95
pestles, 273, 275, 277, 282, 286
petrified wood, 115, 116, 117
phallic object, 115, 116
Piedras Negras, 262; carved cat ulnae from, 182, 194; ceramic beads from, 46; ceramic laminate from, 125–26; figurines from, 10, 11; headbands from, 108; pectorals depicted at, 134; pyrite mirrors from, 103; rasps from, 132; shell ornaments from, 141, 149, 154
pigments, 113–15
pine, 201, 205–6, 214
plant remains: discussion of, 212–15; by provenience, 202–4; by taxon, 204–5. *See also* individual plant name
polished axes: in rapidly abandoned structures, 274, 280, 285, 287, 292, 295, 301, 311, 313
popol naah, 312, 329
pumice stones, 113, 114
Punto de Chimino, 215, 255, 320, 322
purslane, 209, 211
pyrite artifacts: beads, 97–98; burned, 103; button-shaped, 97, 98; classification of, 96, 97–100; distribution of, 101, 108, 110; mirror mosaic pieces, 98–100; nodules, 97, 98; plaques, 97, 98; in rapidly abandoned structures, 274, 275, 281, 282; reworked mirror mosaic pieces, 100, 101; ring, 97, 98

Quen Santo, 132
Quim Chi Hilan, 323, 326
Quirigua, 185

radiocarbon dates, 331–32
rapidly abandoned structures: artifact use in, 316–19; ceramic vessel volumes in, 317; ceramic weight associated with, 316; distribution of artifacts in, 273–74; distribution of ceramic

vessels in, 272; organization of domestic groups in, 315–16; space use in, 313–14. *See also* Structure M7-34; Structure M8-2 and M8-3; Structure M8-4; Structure M8-8; Structure M8-13

ritual, 198–99: in Barranca Escondida, 322, 323; dogs and, 187; in Main Plaza, 324; in rapidly abandoned structures, 287, 304, 306. *See also* termination ritual deposits

royal court, lives of, 328–30. *See also* Structure M7-22; Structure M7-32; Than Te' K'inich

salmwood, 206, 207

San Agustín Acasaguastlan, 103

San José, 103, 258

Santa Elena, 115

sapodilla, 207, 211

sapote, 211

Sheets, Payson D., 198

shell artifacts: adornos, 173, 174, 176, 181, 182; beads, 143, 147, 149, 167, 173, 180, 182, 184; bowl, 173; circular disks, 154; classification of, 141; condition of, 157; debitage, 145, 153, 156, 167, 173, 174, 181; disks, 176, 182; distribution of, 142; ear ornament, 144, 152, 154; found in elite residences, 156; illustrations of, 143–48, 150–54; paint pots, 178; pendants, 149, 152; perforated ornaments, 143, 144; plaques, 144, 154, 167, 173; in rapidly abandoned structures, 282, 284, 285, 294, 295, 296, 300, 301, 304, 306, 311, 312, 313, 315; rings, 143, 147, 149; spear thrower finger loops, 145, 151, 152, 155; tinklers, 143, 147, 149, 166, 167, 173, 176, 179, 180, 181, 182; trumpet, 145, 155; unperforated ornaments, 144; working of, 156, 180, 181, 198, 282, 285, 296, 298, 300, 327–28

Sierra Lacondon, 186

specialization, 197–98, 296

spindle whorls: associated with figurines, 15; distribution of, 50; doughnut-shaped, 50, 53; generally associated with female activities, 49, 318; hemisphere or constricted hemisphere-shaped, 50; illustrations of, 51–53; in rapidly abandoned structures, 273, 283, 293, 295, 296, 298, 300, 302, 303, 304, 308, 312, 313, 318; round, 50; types and materials of, 50; worked sherd, 39

squash, 208

status: animal remains and, 197; food preparation location and, 328–29; vessel use, vessel size and, 317–18. *See also* elites

stelae: conclusions about, 255; dates on, 234; Stela 2, 233, 237, 238; Stela 3, 233, 323; Stela 6, 233, 235, 236, 238, 239, 244, 325; Stela 7, 135, 149, 234–35, 236, 237, 238, 244; Stela 13, 236–37, 238, 240, 241; Stela 14, 235, 237, 238, 241–44; Stela 15, 248–50, 252; Stela 16, 250–52, 255, 322, 324; Stela 17, 238, 252, 253; Stela 18, 237–38, 252–55, 323; Stela 19, 233–34, 235, 237, 238, 244–48

stone ornaments: beads, 84, 85, 86, 87, 88; button-shaped, 91; classification of, 84–91; condition of, 95, 96; diadem, 92, 93, 94, 107–8, 275, 282; ear, 91; headband, 92–93; intentional breakage of, 94, 95, 96; materials of, 84; mosaic inlays, 91; plaques, 87, 91, 92, 94; preforms, 91; in rapidly abandoned structures, 284, 294. *See also* greenstone

Structure M7-22: alabaster pieces from, 110, 111, 112; animal remains from, 162, 166–67, 168, 170, 172, 173, 174, 187, 188, 192; bone artifacts from, 129, 132, 134, 135, 136; burning of, 327, 328; carved bones from, 261, 262, 264; carved shell from, 264; ceramic laminates from, 119, 123; ceramic vessels from, 272, 273, 316, 317; distribution of artifacts in, 274; figurines from, 10, 14; as main living quarter of the king, 327; metates from, 54, 55, 56, 70; mirror backs from, 102, 103, 105; plant remains from, 201, 202, 204, 205, 206, 209, 210, 211, 327; polychrome bowl from, 256–58; pyrite artifacts from, 98, 101, 224; radiocarbon dates from, 332; shell artifacts from, 147, 149, 155; spindle whorls from, 49, 50, 51; stone ornaments from, 88, 89, 91, 94, 95; storage chamber in, 14, 129, 135; termination ritual deposits in, 167, 168, 170, 172, 173, 174, 187, 188, 192, 202, 203, 327

Structure M7-32: alabaster vessels from, 110, 111, 112; animal remains from, 168, 170, 172–74, 187, 188, 192, 194, 195, 199; bone artifacts from, 136; carved shell from, 266; burning of, 327, 328; ceramic artifacts from, 45; ceramic vessels from, 316; emptied before final attack on site, 325; figurines from, 10, 14, 327; grinding tools from, 56, 67, 70; mirror backs from, 105; plant remains from, 203, 204, 205, 208; pyrite artifacts from, 101; radiocarbon dates from, 332; shell artifacts from, 147, 148, 155, 198; space use in, 314; spindle whorls from, 49, 50, 51; stone ornaments from, 88, 94; termination ritual deposits in, 45–46, 88, 94, 101, 157, 168, 170, 188, 192, 194, 195, 199–200, 203, 204, 205, 266, 327

Structure M7-34: animal remains from, 165, 168, 169, 171, 181–82, 186, 187, 188, 192, 193, 195, 196, 197, 199, 200; bone artifacts from, 140; ceramic vessels from, 272, 273, 307, 316, 317; chipped stone tools from, 310; distribution of artifacts in, 274, 307, 308, 309, 310, 311, 312; doughnut stones from, 76, 78; figurines from, 10, 15; function of, 304–6, 312–13; grinding tools from, 64, 65, 69, 70, 72, 73–74, 303, 308, 312; obsidian from, 309; plant remains from, 202, 203, 204, 205, 208–9; polished axes from, 311; possible change in function of, 312–13; as possible communal house, 316; possible feasting at, 208, 312; as possible theatrical setting, 329; possible use of skins in, 182–83, 198; pumice stones from, 114; shell artifacts from, 154, 182; spindle whorls from, 50; stone ornaments from, 90, 98; worked sherds from, 40, 43, 44, 285

Structure M7-35: bark beater from, 319; bone artifacts from, 129, 132, 166, 287; ceramic vessels from, 316; figurine manufacture in, 318; food preparation in, 328; grinding tools from, 71; occupied by lower-ranked elite, 296; organization of domestic group in, 315; shell artifact from, 155; space use in, 275, 287, 313, 314

Structure M7-91: animal remains from, 168, 169, 171, 182–83, 187, 188, 192, 193, 195, 197, 198, 199, 200; bone artifacts from, 140; butchering in, 198, 305, 312; ceramic vessels from, 272, 316, 317; distribution of artifacts in, 273, 274; doughnut stone from, 76, 78; function of, 312; grinding tools from, 65, 70, 71, 72, 75; pumice stones from, 114; shell artifacts from, 154, 155

Structure M7-92: animal remains from, 182, 187, 195, 197, 199, 200; butchering in, 198, 305, 312; bone artifacts from, 140; ceramic vessels from, 272, 316, 317; distribution of artifacts in, 273, 274; doughnut stone from, 76; function of, 312; grinding tools from, 70, 71, 72, 312; shell artifacts from, 154; spindle whorls from, 50

Structure M8-2 and M8-3: animal remains from, 168–69, 171, 180–81, 185, 186, 187, 188, 192, 193, 195, 196, 200; bone artifacts from, 135, 140, 261, 264; ceramic vessels from, 272, 302;

chipped stone tools from, 305; distribution of artifacts in, 273, 274, 302, 303, 304, 305, 306; doughnut stones from, 76, 78; figurines from, 10, 14–15; function of, 299–303; grinding tools from, 61, 64, 69, 70, 71, 72, 74, 75, 303; obsidian from, 304; plant remains from, 204, 205, 209, 212; polishing stones from, 306; pumice stones from, 114; shell artifacts from, 153, 156, 198, 306; spindle whorls from, 49, 50, 53; stone ornaments from, 306; worked sherds from, 39
Structure M8-4: alabaster vessels from, 110, 111, 112; animal remains from, 168–69, 171, 174–76, 186, 188, 192, 193, 194, 195, 197, 199; bone artifacts from, 129, 132, 133, 135, 137, 138, 154, 156, 167, 185, 186, 196, 283; carved bones from, 261, 264; ceramic beads from, 45; ceramic laminates from, 124–25; ceramic vessels in, 276; chert smoother from, 287; chipped stone tools from, 279; clay bells from, 11; distribution of artifacts in, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286; doughnut stones from, 76, 77; figurine molds from, 15; figurines from, 10, 14; function of, 271, 275, 282, 285; grinding tools from, 56, 57, 64, 65, 66, 67, 70, 71, 72, 74, 75, 277; mirror backs from, 106, 107, 108, 109; miscellaneous ground stone from, 79; obsidian from, 278; pigments from, 115; plant remains from, 203–4, 205, 206, 208, 209, 210, 211, 212, 221, 224; polished axes from, 280; pumice stones from, 114; pyrite artifacts from, 99, 100, 101, 281, 282; shell artifacts from, 148, 150, 151, 155, 198, 284; spindle whorls from, 50, 51; stone ornaments from, 87, 89, 91, 92, 94, 98, 284; stone pestles and palettes from, 286; textile production in and around, 156; unfired clay from, 48; worked sherds from, 42, 43, 44, 45
Structure M8-8: animal remains from, 168, 169, 171, 176–77, 185, 186, 187, 188, 192, 194, 195, 196, 197, 199; bone artifacts from, 135, 138, 139, 156, 293; ceramic vessels from, 272, 288, 316, 317; chipped stone tools from, 291; distribution of artifacts in, 273, 274, 288, 289, 290, 291, 292. 293, 294; doughnut stones from, 76, 77, 78; figurines from, 10, 14, 38; flat limestone blocks from, 76, 79–80; food preparation in, 329; function of, 285–87, 295–96, 318; grinding tools from, 57, 58–60, 68, 70, 71, 72, 73, 75, 289; mirror backs from, 108; obsidian from, 290; organization of domestic group in, 315–16; phallic object from, 115, 116; plant remains from, 202, 203, 205, 206, 208, 209, 210, 211, 212; polished axes from, 292; pumice stones from, 114; shell artifacts from, 152, 155, 156, 185, 198, 294; shell working in, 198; space use in, 313, 314; spindle whorls from, 50, 52; stone ornaments from, 84, 86, 90, 91, 94, 98, 294; textile production in, 156; unfired clay from, 48
Structure M8-10: alabaster vessel from, 111; animal remains from, 159, 168, 169, 171, 177–79, 185, 186, 187, 188, 192, 193, 194, 195, 196, 197; bone and shell working in, 156, 298, 315, 327–28; bone artifacts from, 132, 156; ceramic laminates from, 125; ceramic vessels from, 316; as elite residence, 328; figurine from, 10; food preparation in, 328–29; grinding tools from, 68, 70; midden associated with, 296, 297, 314; obsidian blades from, 287; organization of domestic group at, 315; pyrite ornament from, 97; scribal work in, 275, 329; shell artifacts from, 153, 154, 198; shell ink pots from, 155, 275; space use in, 287, 313, 314, 318; worked sherds from, 39
Structure M8-13: alabaster vessels from, 110, 111, 113, 259; animal remains from, 168, 169, 171, 179, 180–81, 185, 186, 187, 188, 192, 193, 195, 196, 197, 198, 199; bone artifacts from, 140, 180; bone working in, 180, 196, 198, 328; ceramic vessels from, 272, 273, 297, 316, 317; chipped stone tools from, 300; distribution of artifacts from, 274, 298, 299, 300, 301; doughnut stones from, 76, 78; figurines from, 10, 14; function of, 296–99, 314; grinding tools from, 54, 60, 61, 68, 70, 72, 73, 75, 298; as lower status elite structure, 94, 156; miscellaneous ground stone from, 79, 301; obsidian from, 299; organization of domestic group in, 315; plant remains from, 202, 204, 205, 208, 212; shell artifacts from, 153, 155, 301; shell working in and around, 156, 328; space use in, 314; spindle whorls from, 50, 52; stone ornaments from, 90, 91, 301; worked sherds from, 39, 40, 44

Tahn Te' K'inich: enemies targeted buildings of, 327; meaning of name of, 234–35; monuments of, 255; name glyph of, 235; as ruler of Aguateca at its end, 325; shown with Jester God diadem on stelae, 94
Tamarindito: ceramic laminates at, 125; Early Classic period at, 322; early control of Aguateca area by, 6; middle Late Classic period at, 326; pots from Ik' site at, 258; stelae at, 237, 249–50, 252, 324
Taube, Karl A., 105–6
Teotihuacan, 105, 106
termination ritual deposits: alabaster bowl fragments from, 259; animal remains from, 167, 168, 170, 172, 173, 185, 186, 187, 188, 192, 193, 194, 195, 196; bone and shell artifacts from, 149, 157; carved shell from, 266; ceramic beads and rings from, 45; figurines from, 14; greenstone ornaments from, 87–88, 91, 94–95; origin of materials in, 327–28; plant remains from, 202, 203, 206, 208, 211; pyrite artifacts and mirror backs from, 97, 101
textile production: possible use of bone artifacts in, 127, 129, 156; in rapidly abandoned structures, 271, 285, 287, 295, 300, 304, 312, 313, 318; as women's activity, 149, 318
texts, miscellaneous: on alabaster bowls, 258–61; on carved bones, 261–64, 265–66; on carved shells, 264, 266–67; on ceramic vessel, 256–58; on polished stones, 261
Tikal, 322; alabaster bowls from, 258; bone spatulas from, 261; ceramic effigy from, 105; pectorals depicted at, 134; perforated deer antlers from, 132; petrified wood from, 117; rasp from, 132; royal compounds at, 328; royal food preparation facilities at, 329; sapodilla at, 211; stelae at, 248; turtle shell disk from, 134
Tonina, 93, 132, 258, 261
tooth artifacts, 136, 175, 177, 178, 182, 187
Topoxte, 93, 149
turtle shell: disk, 133, 175; carapaces used as drums, 132, 135; carved, 135

Uaxactun, 132, 149, 154, 258, 261
Uxmal, 258

vertebrates: counts by structure of, 170–72; taxonomic list of, 161–62. *See also* names of individual animals

white-tailed deer, 195–96; carbonisotope data on, 215; proportion of juvenile and left elements from, 192, 193; structure assemblages of, 188, 189

wild tamarind, 210
Wiseman, Frederick M., 215
women: depicted on figurines, 12, 13, 15, 16, 27; figurines used primarily by, 285, 313, 330; food preparation by, 285, 313, 318; spatial division of areas used by, 271, 285, 287, 295, 298, 300, 312, 313, 314, 318; textile production by, 49, 285, 313; use of lithic tools by, 318
worked sherds: as basal molds, 42–43; clay adhering to, 45; medium-sized round, 39, 40, 41; with notched ends, 39, 41; in rapidly abandoned structures, 273, 280, 283–85, 301, 306, 311, 318; with rough edges, 40, 42, 43, 44–45; with smoothed edges, 40, 42; used in figurine production, 43, 306, 318

Xunantunich, 205, 213

Yarumela, 206
Yaxchilan, 134, 258, 261
Yax Nuun Ahiin, 105
Yaxuna, 93

Zaculeu, 103